

Hynix:  
A Case Study on Development Incentives in Lane County

by  
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## Executive Summary

While much has been written and said about Hynix Semiconductor America's presence in the Eugene-Springfield area, we do not know of any formal study examining its economic impact since its location. In response, this study examines the economic impact of Hynix's presence in the Eugene-Springfield area over the first five years of operation, 1997 through 2001. The following table is a summary of our study's findings.

Table A: Economic Impacts Relating to Hynix's move into Eugene, Oregon.

Negative Economic Impacts		Positive Economic Impacts	
Tax breaks awarded to Hynix	\$46.0 million	Local taxes paid by Hynix	\$5.7 million
City road enhancement	\$3.0 million	Systems development charge paid by Hynix to city of Eugene	\$3.7 million
Chance of increased local water rates if severe drought	uncalculated	Electrical substation, paid for by Hynix	\$8.6 million
Congestion	uncalculated	Facility construction of Hynix	Local effects uncalculated
		Local spending generated by wages and compensation of Hynix employees	\$254.5 million
		Taxes paid by employees of Hynix	\$2.5 million - \$5.2 million
<b>Total Negative Impact</b>	<b>\$49.0 million</b>	<b>Total Positive Impact</b>	<b>\$275.0 million - \$277.7 million</b>
<b>NET IMPACT: \$226.0 million - \$228.7 million</b>			

Other findings of the study include:

- Hynix has employed an average of 644 employees between 1997 and 2001.
- Hynix has paid a total of \$5,710,616 in taxes as of 2002.
- Hynix has received a total of \$46 million dollars in tax exemptions as of 2002.
- Hynix destroyed 10.4 acres of wetland to build its factory, and enhanced or restored 25.59 acres to compensate.
- EWEB designed special water and electricity rates for Hynix, which included maintenance and expansion costs, and used independent energy contracts to insulate Eugene customers from rate increases.
- Hynix no longer qualifies for property tax exemptions on existing buildings and property as of 2002. It can continue to receive property tax exemptions on new investments, as long as it increases its employment by 10% each time it applies for an exemption.

## Introduction

In 1994, Hyundai's semiconductor division (which later became known as Hynix) began searching for a new factory site. In 1995, they decided to build in Eugene's enterprise zone<sup>1</sup>. A variety of reasons can be cited for this move, ranging from jumping international tariffs to taking advantage of the tax exemptions offered by the city of Eugene as a lure for business development. For the purposes of this study, we will examine the business incentives Eugene and Lane County offered Hynix and whether the cost of those incentives was compensated by the benefits the community reaped from Hynix.

Our research will examine the development incentives that were used to entice Hynix to move into the local area and continue to keep it here. It is important to research these incentives, which can include free or lower cost development of roads, free land use, low cost energy packages, and various tax exemptions, in order to find if the city regains its investment from the company. We accomplish this through formal cost benefit analysis. If these incentives are costing the local government more than the ultimate benefit yielded to the community by the firm, then the incentive programs should be reexamined. Much of the cost benefit analysis done on incentive programs has revealed that there are no guarantees of net benefits. As stated in *Evaluating Business Development Incentives*, "In general, academic literature is divided between studies finding major effects associated with growth and those finding negative or inconclusive results. Thus far, negative and inconclusive study findings are more numerous than those finding positive correlations."<sup>2</sup> Therefore it is imperative that we determine if our local development incentives program follows or defies this trend, in order to ensure that any future development will be beneficial to the community. The evidence we find can then be applied to plans that will affect future business investment in Lane County.

It is important to acknowledge this study's limitations. This is not a comparison between two kinds of development programs – for example we cannot tell whether large scale economic development such as Hynix is better than small business development. We can only show our findings as to the financial costs to the City of Eugene in bringing Hynix to West Eugene and the financial repercussions to date. This study makes no attempt to forecast any future revenues, only to report what has actually come to pass.

### *A Short Summary of Hynix in Eugene*

Several problems arose when Eugene's population heard that a large corporation planned to build a factory in west Eugene. The first problem was that Eugene's enterprise zone, the area where Hynix would have to build in order to receive tax exemptions, was a semi remote wetland with sparsely used roads leading in and out and little other development. No large scale sewage or electrical facilities were near by, and there was wildlife living where the plant would stand. Of the many hurdles Hynix was to face, public outcry came first. According to a Register Guard article from June of 1995, many felt that the public had no say in the establishment of Hynix. Then director of the Eugene-Springfield Metropolitan Partnership stated, "Anyone opposed to large industrial projects at that site [West Eugene's Enterprise Zone] should have voiced concerns 13 years ago [1982] when the property's light-industrial zoning was cemented into a metro-wide land use plan. Or, they could have spoken up 8 years ago [1988] when the City Council designated the area an enterprise zone, awarding property tax relief to new or expanding companies."<sup>3</sup>

As a result of these laws, Hynix was able to break ground in 1995, finish construction in 1996, and begin hiring in 1997, despite public dismay. Other obstacles for the company included

wetland restoration, electrical and sewage construction, road difficulties, and finally, the various applications to receive the enterprise zone tax exemptions. Estimates from the County Tax Assessor conclude that, to the date of this publication, Hynix has received some 46 million dollars in tax exemptions. These will be discussed at length in the "cost" section of this study. To our knowledge, a formal cost benefit analysis of the Hynix program has never been conducted.

### *Introductory Notes*

For the context of this study, it is imperative to explain the meaning of an enterprise zone, and what are the specific requirements of the West Eugene enterprise zone. Firstly, an enterprise zone is any area designated by a city, county, or state, to be exclusively cultivated for business development. How an area "cultivates" this zone can vary regionally. Some states allow direct cash donation to be made to companies that agree to reside within their enterprise zone. Oregon does not allow that, the chosen method of enticing business development here is to award property tax exemptions. Of course, there are stipulations the company must follow as well. Some must agree to reside inside the zone for a certain amount of years, employ a certain amount of people, or pay a particular base wage.

The West Eugene Enterprise zone offered (the program had since been retired, although companies who entered before the sunset year still qualify for incentives) a three year property tax exemption. They can request a two year extension of the initial exemption, which is dependent on approval from the city. The various taxes included under the classification of "property tax" will be discussed later. In return, the corporation moving into the enterprise zone had to meet the following requirements: the company must reside within the boundary, be non-

retail, increase employment by 10% each time it makes a new investment for which it wants a personal property or regular property tax break, and maintain a suitable number of employees based on a fraction of its highest employment levels. Hynix has met these requirements save one time. When reapplying for a personal property tax break in 2002, they dipped below the 10% employment expansion criteria. They were only awarded a partial tax exemption, which is discussed further in the analysis section of this study. Hynix did pay an estimated \$3.3 million for the property within the zone; it was not awarded by the city.

## **Literature Review**

In order to properly prepare for this study, we examined several similar papers and consulted methodology texts to ensure that we have some sense of how to conduct our data collection and analysis. We found many important methods for calculating and compiling data that we chose to use.

The first component of our analysis was to find a way to calculate total economic impact of wages and salaries. In researching, we discovered that the most common tool used for this is a multiplier. We will more thoroughly discuss multipliers in the methodology and benefits sections of this paper. *The Economic Significance of Toyota Motor Manufacturing, U.S.A., INC, In Kentucky*, a study done by Calantone and Loof at the University of Kentucky, used multipliers to calculate the entire impact of Toyota's wages and salaries on the state economy<sup>4</sup>. In addition, *A Study of the Economic Impact of the University of Oregon* by Larry Singell, Ph.d, had extensive advice on how to develop and use multipliers to estimate economic impacts on the Oregon State economy. Both studies examined how an individual firm would affect local economic activity, and develop a basis for suppliers to move into their areas.<sup>5</sup>

When deciding to use a multiplier, one must either find a pre-constructed one that is reliable, or create one. Creating a multiplier requires complete revenue data from the individual firm, and survey information from other local businesses to establish how much spending is generating from the firm in question. This was beyond the scope of this study, so following the models in the Toyota Study, as well as *The Economic Impacts of a Steel Mill in Coos County* by Arthur Ayre, we choose to use an input-out model<sup>6</sup>.

The benefit of this type of impact model is that it takes into account several different facets of economic impact, including how many suppliers will work with the firm in question, how much revenue the firm in question will generate in the new area, multipliers for employment, economic impact, and other useful statistics. IMPLAN is so precise, that it will even calculate how many new people may move into the area to work for the new business, or how many new people will be employed in other industries, such as food or services industries, to accommodate the increasing revenue from the new firm. The Coos Bay study used IMPLAN to calculate many of these things, although that study was completely hypothetical (how would a new firm affect the economy) whereas our study is based on historical data. IMPLAN derives its statistics from United States Census Bureau information. The Toyota Study used a different input-output model. After discovering the Oregon State University maintained an IMPLAN model for Oregon, we chose to use it, because we had access to Bruce Sorte, the individual who maintains the model.

Finally, estimating data when it is not available can raise certain issues. When estimating the tax base changes due to the taxes paid by Hynix's employees, we followed the method of using averages calculated state organization such as the Oregon Department of Revenue. This

method is used in Larry Singell's study, and is a common trick for giving an estimate that, while it may not be perfect, reflects fiscal chances with some accuracy.

## **Data Collection and Estimation**

This study required different methodologies based on its different stages: collection gathering, data estimation, and data analysis. We'll discuss each separately and in detail:

### *Data Collection*

Ascertaining the value of costs and benefits of Hynix's move into Eugene, Oregon was not an easy matter. Firstly, there was no single data source. The following organizations had to be contacted to compile the information you see in this study: The City of Eugene Planning Department, EWEB (Eugene Water and Electric Board), Hynix Corporation, The Wetlands Mitigation Bank, The County Tax Assessors Office, The Register-Guard, Eugene's Land Use Permit Office, Eugene's Permit Building Office, and finally, Oregon State University's Economics Department, which kindly aided us with our IMPLAN model multipliers. In addition, the cost of conducting city wide records searches is extremely high. Therefore we have relied heavily on information gained through interviews, and the individuals who provided us with that information are cited as references for this paper.

Data estimation was another challenge. Much of the information required to complete this study was either classified (e.g. Hynix's utility bills, exact wages vs. total compensation) or incomplete (e.g. how much money was put into the local economy when Hynix built its plant). When possible, we estimated data. For example, when estimating taxes paid by Hynix employees, we used state or Lane County averages to estimate the possible tax benefits. This is a

common methodology in economics and although it may seem inexact, it provides a more complete estimate than would disregarding the unknown data entirely.

Finally, data analysis provided its own set of problems. For example, once we knew how much Hynix paid in wages, we had to apply a multiplier to it to discover how much spending was generated in our local community. We used a multiplier from the IMPLAN model<sup>7</sup>. The IMPLAN model was originally developed by the University of Minnesota for the United States Government. IMPLAN stands for Impact PLANning, and was first heavily utilized by the United States Forest Service. This model compiles a massive quantity of information, mostly based off federal census data, and uses it to calculate each industry's effect on other industries. By taking census data, it finds the links between the industries (for example, if a semiconductor plant moves into an area, will it create suppliers? How many new residents will it attract to the area? How much money will these people spend in the local economy versus somewhere else?)

The unique quality that IMPLAN possesses is that it uses various multipliers to demonstrate three main things: the impact on all local firms that could become suppliers to the new business, the impact on the local retail economy of the firm's new employees, and the continuing multiplier effects on the local economy. A multiplier is a generated number that provides not only the direct effect a company has on an economy (for example, the new firm will pay an employee \$34,000), but also how that direct effect is continually spent in the local economy through input-output relationships between sectors. This is more thoroughly explained in the benefits sections of this study, when it is actually applied.

Originally, we intended to create only a cost benefit analysis. However, due to the difficulty of defining what may be a benefit to the economy, we chose to present data in terms of negative and positive economic impacts. A negative impact would take money out of the

community, whereas a positive impact would bring money into it. A positive impact and a benefit are not the same thing. For example, the wages and benefits paid to Hynix employees create a positive impact on our local economy, but they might not entirely be a benefit. A benefit would mean those wages and benefits would not have already been paid if Hynix were not here (some of Hynix's workers may have been previously employed in Lane County, and would have been paying taxes and receiving wages already). Thus, the added benefit of working for Hynix would only be the increase in wages and taxes paid over the previous employer. This is significantly more difficult to calculate, and we took much more liberty with those estimates. Thus, we hope in providing you with both, and you can fully realize the Hynix's impact and benefit to the community.

## **Costs and Negative Economic Impacts**

We have divided the cost of Hynix's move into the Eugene area into four categories: Taxes, Roads, Utilities, and Wetlands. We have included some things in this section that actually turn out to be benefits because they were originally anticipated as costs. Some of these categories imply indirect costs, i.e. if no taxes are paid, how does that affect schools? These will be discussed as needed within each subsection.

### *Taxes*

The taxes that are lost to the community in which the firm locates can be considered a cost or excluded from costs. There are two ways to approach this decision. The first approach is to consider the lost tax revenue as a cost to the community because it is money they should be collecting from the firm. Presumably, such revenues are necessary to cover the costs of local

public services and infrastructure used by the firm. When a particular business receives tax exemptions, it is common to wonder why that particular company, and not another, should receive special treatment.

Alternatively, a second approach is to consider the lost tax revenue as money that would have never been generated if the firm had not located in the region. If sufficient incentives were not offered to convince Hynix to move into the area, it begs the question that other business of its scale may have made similar choices. In addition, not offering development incentives puts Lane County at a disadvantage in comparison to other regions, some of which offer outright cash awards for business development. We must consider that there is little evidence that if Hynix had not located here that another firm would have generated the same tax revenue. For this study, we have chosen not to take a position, but to offer this information as a guide, as well as the scenario below, recognizing that this issue has no one right answer and is currently debated in the world of economics. In our tables, we place the tax exemptions under negative economic impacts, to display the most conservative number possible.

The following is a standard way that economists think about firm location decisions. Regions competing for business development enter a situation that economists call a prisoner's dilemma: where both parties would be better off if they communicated, but because they do not want to reveal their positions to each other, an inefficient result ensues. Suppose there are two regions, A and B, and they are competing for a particular firm. Suppose the firm inherently prefers region A, because it knows it will have higher profitability there, (e.g. 4 million in profit per year, whereas in region B they would only have 2 million in profit per year) and all other factors are equal (both regions can offer the same amount of development incentives, suppose up to 5 million). Each region can only bid incentives up to the point where their net benefits from

the investment would be zero. In practice, this may be difficult to do because the benefits and costs of such incentives and firm location are unknown and must be estimated. If region B offers 5 million dollars in development incentives, it will boost profits up to 6 million a year. But region A has the profit advantage, and thus if they offer 2.1 million in incentives, the firm's profits will increase to 6.1 million. Therefore regions with the higher net benefit would like to offer incentives just above the competitors offer in order to win the bidding process. In fact, in the process, the firm receives benefits that it would not receive without the bidding war.

Some might ask why region A would bid at all. If they don't, they lose the opportunity to have any revenue whatsoever because region B will attract the business. If the bidding process was banned, region A would win anyway, and everyone would be better off, but the competition is allowed, and thus region A must play the game to win the firm. In the end, the bidding process does not change the location decision; it just transfers funds from the winning region to the firm, unless one region decides not to play.

If one decides to include taxes as a cost, it is necessary to differentiate between the types of taxes Hynix would hypothetically pay. The first is property tax that is not exempt. There are taxes on the actual land, which are not exempt. This figure is small and has never been part of the tax exemptions offered by the City of Eugene. The second is regular property tax - the traditional tax paid on buildings and structures by any person or corporation owning property. This tax was exempted for the first 3 years the plant existed. Hynix received a 3 year exemption for locating into the enterprise zone, and opted to reapply and extend the exemption for two more years thereafter, which was denied by the city. However, in 2002 the original exemption expired and it cannot be reinstated<sup>8</sup>. As of 2002, Hynix will pay standard property tax, and has done so since then in numbers totaling \$5.2 million<sup>9</sup>.

The final kind of tax is perhaps the most controversial. Personal property tax is a figure paid to the city, county, and state based on the value of the equipment owned by a corporation. Hynix's equipment could very well be valued at more than its property and plant put together. However, new equipment purchased for any corporation in the enterprise zone is eligible for a three year tax exemption from the date of its purchase. Since the plant's construction, Hynix has retooled before any equipment tax exemption could expire. This is a common occurrence in the semi-conductor industry, where changing technology requires the purchase of new machinery every 2-3 years. However the result is that Hynix has never paid personal property tax on exempted items (there are some non-exempt items, such as office supplies, computers, and all other "rolling stock"), and as long as it retools all of its equipment every three years, it never will.

An indirect cost of non-taxation is how the lack of new taxes will affect school, city, and county budgets. The tax exemption law states that in order for a locality to disregard these effects, the corporation will have to employ a certain number of people at all times, assuming that the financial benefit to the community with that many more people working will cancel out any negative tax cost. Hynix has been held to this standard. In 2002, Hynix's employment dipped below the mandatory 986 workers it needed to qualify for a tax extension. At the time, only 747 people were employed at the factory. Due to their failure to meet the requirement, the city gave only a partial net tax exemption. Hynix had to pay \$346,405 directly to 4J, Bethel, Lane Community College, and Lane ESD school programs, \$138,855 to the city of Eugene, and \$25,356 to Lane County, thus the net tax exemption during this period was \$514,107.<sup>iv</sup> According to the city planner, this gave more revenue to schools in the long run, because if the

money had been paid to Salem through taxes, schools would have received less due to subsequent budget cuts.

One particularly interesting finding is that misinformation permeates Eugene with concern to Hynix's tax exemptions. When interviewing people, we found the majority believed Hynix received a much more generous exemption than the reality. The Register Guard originally estimated that, based off a three phase plan introduced by Hynix when construction was still in the theoretical phase, the plant would eventually qualify for up to 170 million dollars in tax exemptions. Many people believed that Hynix, as of 2002, had received somewhere close to this figure. In reality, Hynix has received 46 million dollars in tax relief as of 2003<sup>10</sup>. This has been given out through 2 different sets of tax exemptions: the original property tax relief awarded through the enterprise zone, and another exemption on just personal property obtained through retooling in 2002.

**Taxes Avoided: \$46 million**

**Taxes Paid: \$510,616 (property taxes paid for lack of employment)**

**\$5.2 paid in property taxes**

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**\$5,710,616**

### *Roads*

The road infrastructure in the West Eugene Enterprise Zone was not sufficient to accommodate a large factory like Hynix when construction was being contemplated in 1995. In order to facilitate development, the City of Eugene improved a currently existing road near the plant. According to Denny Braud, a planner with the city of Eugene, an estimated 3 million dollars<sup>iv</sup> was spent to further develop the intersection of Highway 126 and Willow Creek Road, including the installation of a traffic light and a turn lane. He states that these changes were in

the city's long term plan, and while Hynix's arrival pushed them forward, they were not altogether unforeseen.

It's important to note that when a corporation moves into a city, it is required to pay a "Systems Development Charge" or SDC, to recover costs like road impact. Hynix paid 3.7<sup>11</sup> million dollars in SDCs to the city of Eugene in accordance with this rule. For the purposes of this study, we will count that as a benefit.

**Total Cost: 3 million**

**Total Benefit: \$3.7 million**

### *Electricity and Sewage Development*

As a semiconductor plant, Hynix requires large quantities of electricity and water to create its product. This was a major concern to the city and Eugene's citizens. First, we will discuss electricity effects. In 1996, EWEB (Eugene Water and Electric Board) and Hynix directly created a power sales agreement stipulating that Hynix would pay up front for the new electrical substation that needed to be built to accommodate the plant. However, that substation is owned by the city of Eugene and EWEB, so this could actually be seen as a benefit. The construction of the plant cost \$8.6 million dollars. EWEB made a short term loan to Hynix, for which its then parent company, Hyundai, signed a guarantor notice. The loan was paid to EWEB within the three years and without delays.

EWEB also realized there would be a local concern that Hynix's power usage would raise the electricity rates for other local customers. In order to prevent this, they purchase independent energy contracts to cover all of Hynix's electricity needs. This, in essence, shields the rest of the system from Hynix's energy use. The cost of buying these independent contracts, as well as the cost of any maintenance needed for Hynix's electricity station, is built into the rate that they pay.

EWEB representative Mel Taylor states that EWEB made the conscience choice to charge Hynix for all of these things in order to not raise energy rates for the community. He also stated that Hynix had a choice to either guarantee usage for a twenty year period of time, or pay for the power station up front, of which they chose the latter. Hynix's actual electricity rates and usage statistics are not public information. However, from this discussion, we assume that Hynix's presence in the community has caused no net benefit or cost with respect to electricity usage.

**Total Cost: zero**

**Total Benefit: \$8.6 million**

Hynix also requires large quantities of water. We identify three ways in which this may cause additional costs to the community: the expansion of water filtration plants, the probability of a drought, and community water rates. Firstly, Hynix's move into Eugene did "move up" the expansion of an existing water filtration plant. According to Steve West, another EWEB representative, Hynix's water rates were built to include any maintenance or expansion fees EWEB would need to cater to their needs. These fees, like those for electricity, were built into their water rates. According to him, this happens for all large corporations who will affect water capacity in any way. However, the exact figure for the water filtration station's expansion is not public information.

The greater probability that the presence of Hynix could cause emergency restrictions due to such things as a drought is another potential cost. According to Steve West, there would need to be a drought of at least 3 years for Hynix's water usage to become a problem for the rest of the community. In addition, EWEB has lost three major water consumption contracts in the past few years; HMT, Chef Francisco, and Agrapak, the last of which used more water daily than Hynix. So EWEB concludes that Hynix actually forms an important part of their corporate revenue base,

and lack of capacity issues have been significantly reduced with the closing of these companies. However, if one knows the cost of a drought and the probability, they can assess the "cost" the possibility of a three year drought. We mention this in order to give credence to the fact that, if a long drought occurred, Hynix's high water consumption could affect the residents of Eugene. According to EWEB, large corporations are asked to voluntarily reduce their water usage in the event of a drought, but this figure will demonstrate the cost to the county of the possibility that Hynix could affect local water rates. However, EWEB could not provide a cost for us to use in our calculation.

The problem with assessing drought probability is ascertaining the exact definition of drought. Here we turned to one of the State Climatologists, George Taylor who operates out of Oregon State University, for recommendations. He suggested the Surface Water Supply Index as a good source to ascertain drought. The SWSI is maintained by the Natural Resources Conservation Service (NRCS), a sub-department of the US Department of Agriculture. It measures surface water availability (as coming from two sources: reservoir carryover and spring and summer runoff) by a scale ranging from -4.1 (very dry) to 4.1 (very wet). 0.0 is the median water supply throughout the history of the index, which dates back to 1974 (see graph A). The average surface water supply index in summer from 1997 to 2002 is .55, with the low point being the summer of 2001, where the index dipped to -3.2, and the high point being the summer of 2002, where levels rose to 2.5 (see table B).<sup>12</sup> What we can gain from this, is that historically, since 1974, levels have not dipped below median for a constant time span of 3 years, which implies that the probability of a 3 year drought is extremely low. The one high risk time span appears to have been between 1985 and 1988. Here, the SWSI just barely touched 0 in 1986, and the rest of the time it stayed below zero. If a probability could ever be assessed, someone would

simply need to multiply it by the possible water rate hikes due to Hynix, to assess the "cost" of Hynix's presence in Eugene with regards to drought.

Finally, we come to effects of local rates. Like the electricity contract, EWEB took pains to make sure Hynix's move would not affect local water rates. Hynix has a "ceiling" usage built into their contract. If they exceed 1.8 gallons a day, they are assessed a larger fee, per gallon, for any water used above that ceiling<sup>1</sup>. This is also to protect the community from any excess rates derived from Hynix's high water usage. The total cost of Hynix's electricity and water usage and the usage statistics are classified information. Therefore, the only cost assessed to allowing Hynix's water and electricity consumption is that of the possibility of three year drought.

**Total Cost: uncalculated**

*Wetlands*

The West Eugene Enterprise Zone sits on a large acreage of wetlands. This presents many problems for companies wanting to locate there. Firstly, they must establish there are no endangered plants or wildlife that will be destroyed due to their facility's construction, and secondly, they must compensate for wetland destruction by creating new wetland equal to twice the amount they fill. This is mandated through a state law that governs Oregon wetlands, which also created the Wetland Mitigation Bank to oversee and enforce wetland usage and regulations. Under the law, any corporation destroying an acre of wetland must create two more to replace it. There was some belief in the community that the Wetland Mitigation Bank may have awarded already established wetlands to Hynix in order to stave off some of the costs associated with

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<sup>1</sup> Hynix was originally estimated to need 2.5 million gallons of water per day. They have never used this amount, and according to EWEB, rarely approach the ceiling value.

building new land to compensate for the destruction of wetlands within the enterprise zone. This is untrue.

According to Neil Bjorklund, a planner for the city of Eugene who was present during the Eugene hearings regarding Hynix and the West Eugene wetlands, Hynix did in fact pay to restore or enhance wetlands in order to compensate for wetland destruction in the required 1:2 ratio.<sup>11</sup> Hynix destroyed 10.4 acres of wetland in order to build their facility. To compensate, they restored 12.97 acres of wetland, restored a pond encompassing 2 acres within a wetland area, enhanced 6.92 acres of wetland, and enhanced a stream corridor encompassing 3.7 acres within a wetland area. This totals 25.59 acres of restored or enhanced wetland built to compensate for 10.4 destroyed acres, which fulfills the 1:2 ratio dictated by law<sup>13</sup>. What Hynix paid for the restoration is not public information and could not be found for this study, but according to Neil Bjorklund, it would cost the city approximately \$30,000 an acre to restore wetland. He believes Hynix may have been able to pay a slightly lower figure because they contracted privately to restore the land, but they did also hire a consultant to oversee all these activities.

Hynix was also assessed a small fee to conduct a rare plant survey, which verified they would not be destroying endangered plants in the construction of the plant. Although it would be nice to have these numbers, they are not necessary for this section because by fulfilling the law, Hynix eliminated any cost as dictated by law. We understand that placing a numerical value on wetlands is controversial, thus we are accepting the law Oregon established as the standard for this study, assuming that because it was created by a representative government, that it reflects

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<sup>11</sup> Wetland restoration, according to the City of Eugene, means reconstruction of previously destroyed wetland, while wetland enhancement is improvement of badly functioning wetlands. They both include pollution repair, native plant restoration, and fill dirt removal.

the preferences and opinions of the majority of the voting public. However, we respect that there may be those who disagree with this standard of wetland evaluation.

**Total Cost: zero, as the ratio requirement was fulfilled by law.**

### *Congestion*

One possible cost of any large factory is congestion. With an average of 850 employees, Hynix has the potential to significantly increase traffic in the West Eugene Area. Congestion is a cost because it increases wait times for commuters, which implies an opportunity cost to the commuter. Opportunity cost is assessed as the next best a person could be doing, i.e. if a person is sitting in traffic the opportunity cost of that could be them arriving at work earlier, or watching television. Opportunity cost is difficult to quantify, but it needs to be mentioned to thoroughly analyze any cost situation. In this case, we could not obtain records demonstrating the increase in traffic on the streets surrounding Hynix. We did learn however, from Denny Braud, a city planner in Eugene, that these roads do not require above average maintenance, which suggests that there is not currently a congestion issue. However, there may be a lag effect, where the current congestion may not show wear and tear on the roads for a few years. Even if we did obtain the proper records, we would have to isolate Hynix's increased traffic from other factors, such as the fact that housing has expanded into the same area. That is a study within itself. So although we cannot present a numerical result, we feel it is important to mention congestion as a cost factor.

**Total Cost: uncalculated**

### **TOTAL NEGATIVE IMPACTS:**

**Tax exemptions: 46 million**

**City Road Enhancement: 3 million**

**Electricity and Water Consumption: zero**

**Drought Potential: uncalculated**  
**Wetland Destruction: zero**  
**Congestion: uncalculated**

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**Total Costs: 49 million dollars**

## **Positive Economic Impacts**

We now discuss the positive economic impacts to Lane County with regards to the presence of Hynix. We have already cited some benefits as they directly applied to issues related to costs, and those will be totaled at the end, but not included in this section (see Table A in executive summary). Unlike many of the costs, benefits are more difficult to calculate. We will try our best to explain our methods as we proceed, but for additional guidance please reference the methodology section of this paper, which provides further explanation.

### *Wages and Benefits*

The most obvious positive local impact generated by a new plant in a community is the wages and profits it generates for employees and owners. Given that Hynix is owned by a foreign parent company, profits accrue to owners abroad. Thus, the positive economic impact stems primarily from wages and benefits paid to local employees. From 1997 to 2003, Hynix paid an average wage plus benefits package of roughly \$55,649.50 per year, of which the average wage-only portion of the income package paid at Hynix is \$35,615.68, which is 64% of the original figure.<sup>14</sup> Based on standard applied payroll taxes, we can estimate that payroll taxes average \$3650.61 per employee, while benefits, including health insurance, 401k contributions, and paid time off are \$16,383.72. Thus, the average wage and benefits for Hynix employee during our focus period is estimated to be \$51,998.89 (excluding payroll taxes). From numbers

given to us by Jerry Olson at Hynix, the average number of employees at Hynix from 1997 through 2001 was 644. This means that Hynix's total employee compensation from 1997 to 2001 was \$167,436,426. However, the amount of additional local spending these wages and benefits create is likely greater than this amount, as it has what is termed a "multiplier effect" on local community spending.

We will use an example to illustrate how the multiplier effect works. Suppose someone is paid \$100 a week. This initial \$100 not only benefits the community, but generates additional local spending because the person or firm receiving the \$100 will use some of the money to buy goods and services locally, thus providing income to local producers. These producers, in turn, use some of this income to pay wages to employees and pay for supplies from other local producers. These local wage earners and suppliers then use some of this income to buy goods and services locally, etc. Thus, the initial \$100 generates a domino effect of re-spending through the local economy which generates more local spending than the initial \$100. This is the multiplier effect. It tells us that spending in the local economy is "multiplied" out through a series of purchasers who spend a portion of the initial income locally at every step in the series. The IMPLAN model discussed earlier calculates multipliers for various sectors of the economy. We have chosen to use the IMPLAN model's calculation for Lane County's multiplier in the semiconductor industry. In particular, the multiplier we use is IMPLAN's "total value added" multiplier which is used to determine how local value added spending will be multiplied in the community. This multiplier is appropriate since wages and benefits are typically the main portion of value added for any firm. The IMPLAN value added multiplier for the semiconductor industry in Lane county is 1.52. This means for each dollar paid to an employee of Hynix in wages and benefits, \$1.52 of actual local spending will be generated in the Lane

county. Based on the above calculation of wages, this means the total positive impact of wages and benefits paid by Hynix is:

$51998.89 * 644$  (average number of employees) =  $\$33,487,285.16 * 5$  (beginning of 1997 to beginning of 2002) =  $\$167,436,425.80$

$1.52$  (multiplier) \*  $\$167,436,425.80 = \$254,503,367.20$

Note that we are calculating for the years from the beginning of 1997 to the beginning of 2002, as those are the years for which we have data. Thus, in summary, the estimated **total positive impact from wage and benefits to the Eugene-Springfield area is \$254,503,367.20.**

This above calculation is the standard methodology in the literature to estimate the additional local spending generated in a community by the presence/addition of a new firm in a community. This calculation, however, assumes that the new plant's employee positions are additional ones that the community would not enjoy otherwise. Alternatively, one could make the assumption that the number of jobs in the community does not change at all, as workers come from previously existing firms and some marginal firms drop out due to competition (and higher wages) for labor. This is likely an extreme assumption, particularly with Eugene-Springfield's currently high unemployment rates, but nevertheless gives us a lower bound on the positive impacts from Hynix's presence. In fact, even under this restrictive scenario, Hynix brings increased local spending due to the fact that they are compensating their employees at a much higher level than the average comparable worker in the area.

In particular, assume that without Hynix, its current employees would be making the average wage for production workers in Eugene-Springfield, which is \$26,760 according the 2001 data from the Bureau of Labor Statistics.<sup>14</sup> Taking the difference between Hynix's average

wage and the city's average producer wage, multiplying it by the number of employees, the numbers of years, and the multiplier yields the following calculations and results.

$$\begin{aligned} \$35,615.68 - \$26,760 &= \$8,855.68 * 644 = \$5,703,057.92 * 5 = \$28,515,289.60 * 1.52 = \\ & \$43,343,240.19 \end{aligned}$$

Thus, under this scenario, the additional local spending generated by Hynix from additional wages is **\$43,343,240.19**. This calculation only involves the wage component, assuming that existing firms benefits packages are identical to Hynix's even though they do not pay as high of wages. If we assume that the benefits offered by Hynix to its employees are 33% higher than the local norm, as is true with wages, we get a calculation of **\$70,069,228.33** of additional local spending due to increased wages and benefits provided by Hynix. Either way this scenario is fairly restrictive in its assumptions. Yet, our overall net impact of Hynix (once all the negative and positive impacts) are added up, would still yield a positive net impact under this very conservative scenario.

However, one final proviso is that \$100 in wages is likely not the same as an outright benefit of \$100, since the person must work for the wage income. Economists typically think that people suffer disutility (a type of cost) from working. On the other hand, studies of unemployed persons suggest that a job has many positive impacts on the person self-esteem and personal self worth. This is particularly appropriate to consider if some of the Hynix workers would be unemployed without the presence of Hynix. These issues are hardly ever considered in typical business development impact studies, but we mention them here for completeness.

### *Tax Revenue Increases*

Whenever someone receives a higher wage than they previously did, or an unemployed person gains a wage at all, the tax revenue base is affected. This too can be a source of positive impact on the local economy. The first, most obvious outcome is that there will be more taxes paid to the state. The other is more indirect: one theory as to why enterprise zone tax exemptions will not negatively affect the tax base is because the workers employed by those corporations will receive higher than average pay, thus allowing them to upgrade their property. In essence, these new jobs allow people to either buy property or move into more quality rental property, both in turn increasing the amount of property taxes paid to the state.

In order to estimate the amount of taxes paid by Hynix employees, we take the average taxes paid by a Lane county resident, \$2,535<sup>15</sup>, and multiply it by 644 employees, the average number of employees Hynix maintained from 1997-2001. Using these two figures, we can find that the average taxes paid are  $2535 * 644 = \$1,632,540$ . We multiply this by 5 to account for all the years these employees have been paying this income tax<sup>III</sup>.  $5 * 1,632,540 = \$8,162,700$ . Now we face a problem. The tax code changes every year and its difficult to estimate how much money paid in state taxes actually returns to Lane County. We have decided to estimate that, since 13% of Oregon's GDP comes from Lane County, that approximately 13% of Oregon taxes will also return here. This is an inexact estimate, and if one wanted to create a better one, they could examine the annual tax codes for the last five years to determine exactly how much tax money returned to Lane County.  $(.13)(8162540) = \$1,061,130.2$ .

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<sup>III</sup> Why we don't simply find the tax bracket for the average income paid by Hynix and derive the taxes from there? Due to the non-linear fashion of the tax code, and the fact that we do not have data concerning what deductions or credits, this would not be a very accurate estimate of taxes paid. This technique is commonly used in economic studies.

It is harder to calculate the possible contribution of increased property tax. We do not have data on how many of Hynix's employees own homes, so again we must rely on averages. According to the Oregon Economic and Community Development Department 68% of Oregonians owned their own homes as of 1999<sup>16</sup>. If we assume, as Hynix states, that they maintain an average of 644 employees, at least 70% being hired from Lane County, we can conservatively hypothesis that  $(.7)(644) = 451$  employees live in Lane County, and  $(.68)(451) = 307$  of them may own their own homes. Thus, if we take the average property taxes paid in the state of Oregon, which was \$2017 for urban areas and \$956 for rural areas in 1999, we can deduce an upper and lower bound for the property taxes possibly paid by Hynix employees.  $2017*307 = \$619,219*5 = 3,096,095$ . (calculating for the time span between 1997 and 2002), which would be the upper bound assuming all home owners pay the higher property tax, and  $956*307 = 293,492*5 = \$1,467,460$  would be the lower bound, assuming all home owners pay the lower property tax.

**Total Tax Benefits:**

**Income Tax: \$1,061,130.2**

**Property Tax: Between \$1,467,460 and \$4,096,095**

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**TOTAL = Between \$2,528,590.2 and \$5,157,225.50**

Under the more restrictive assumption that Hynix does not lead to any additional employees in the area, only higher wages, the numbers will be much smaller. In terms of payroll taxes, we can estimate that they will be 33% higher for Hynix employees because wages are 33% higher than the county norm for production workers. This means the following calculation and results:

$$0.33*2565*644*5*0.13=\$354,323.97$$

It is hard to estimate how much higher incomes affect average home ownership among employees and thus, lead to increase in property taxes. Thus, to be conservative we assume no increase in property taxes under the conservative scenario.

### *Plant Construction*

Short-run benefits from initial plant construction are often a large focus of studies examining the economic impact of business development. The largest disappointment in our study is the inability to find a figure representing how much money Hynix put into the local community during their facility's construction. It is common knowledge that Hynix spent upwards of 1.2 billion dollars to build the Hynix factory, but how much of that was spent in Lane County remains a mystery. Hynix either did not keep records regarding that, or was unable to release the information to us at the time of this study's publication. We made various calls to construction firms around town, who recalled being subcontracted, but could not provide information or records specifying numbers of employees, man hours, or pay. There is no good way to estimate how much money was spent in Oregon, because we don't even know how much of this figure was spent in the United States. Suffice it to say, there is probably some significant amount of money that is lacking from the benefit section of this study in regards to the plant's construction.

### *Total Positive Economic Impact*

Summing up we have the following accounting of the positive economics impacts from Hynix's presence in the Eugene-Springfield area from 1997-2001. The first set of numbers on the next page follows the standard methods of calculating these impacts, which typically assume

that all employees in the plant are additional jobs. The second set of numbers makes the very conservative assumption that additional jobs are in the local community due to the plant, but recognizes that Hynix is paying higher wages and benefits. Note that some of the positive economic impacts were discussed in the negative economic impact sections.

**Total Positive Economic Impact – Standard Methods:**

**Total Wage and Benefits with Multiplier Effect: \$254.5 million**  
**Taxes from Employees: Between \$2.5 million and \$5.2 million**  
**Tax Payments from Hynix: 5.2 million**  
**Hynix Payments to Schools, City, and County in 2002: \$0.5 million**  
**Electrical Substation: \$8.6 million**  
**Systems Development Charge: \$3.7 million**

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**TOTAL POSITIVE ECONOMIC IMPACT: \$275.0 million - \$277.7 million**

**Total Positive Economic Impact – Conservative Methods:**

**Total Wage and Benefits with Multiplier Effect: \$70.1 million**  
**Additional Taxes from Employees: \$0.4 million**  
**Tax Payments from Hynix: 5.2 million**  
**Hynix Payments to Schools, City, and County in 2002: \$0.5 million**  
**Electrical Substation: \$8.6 million**  
**Systems Development Charge: \$3.7 million**

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**TOTAL POSITIVE ECONOMIC IMPACT: \$88.5 million**

## **Conclusion**

According to our calculations (summarized in the executive summary), when one sums up the negative and positive economic impacts on Lane County from Hynix's presence in the community, the net impact has been quite positive, totaling approximately \$225 million using standard methodologies. Even under very conservative assumptions, we estimate a positive net impact of almost \$40 million (\$88.5 million in positive economic impact minus \$49 million in negative economic impact). As we have noted, we have not been able to include estimates of all possible economic impacts in our calculations, including impacts from initial construction,

congestion effects, etc. However, we have been able to estimate most impacts commonly cited as important and hope the calculations provide a good framework with which to analyze the true economic impact of Hynix on Lane County. Based on our data, and the fact that our largest missing piece of data, construction spending, would all fall under the benefit category, it is our analysis that Lane County made the correct choice to offer development incentives to Hynix. Hopefully more academic literature will be published in the future regarding methods of calculating benefits, at which point someone could re-examine this study's methods, and draw an even more precise conclusion. Although we have discovered there is a positive net impact, it is important to point out some factors, the first being that this study has only evaluated the past. Our data regarded salaries, wages, and tax base changes due to Hynix employees is only through the end of the 2001 fiscal year, and our negative impact data is through 2002. We have not forecasted any future benefit or costs related to Hynix and cannot guarantee that the current trends of positive net impacts will continue.

One of the key arguments against Hynix in the media throughout the past 6 years stated that encouraging small business development would be better for Eugene in the long run than inviting a large scale company that could easily leave town when the economy turned south. A comparison paper evaluating different scenarios, such as comparing the effects of one large business to several smaller businesses, would be an interesting extension of this project. Another interesting comparison would be between Hynix and one of the other large companies residing in a Lane County enterprise zone, such as Monaco, Marathon, or Sony, the last of which just closed.

It is also important to recognize the long term effects of the Eugene community's reaction to Hynix. In comparison with other large scale development incentive programs, which are

always controversial, we feel Eugene's community may have demonstrated a more negative reaction than most, or perhaps its reaction was more clearly publicized. This could possibly discourage other large businesses from locating to Eugene.

Finally, the Hynix's effect on the housing and property values in its areas as an evaluation beyond the scope of this study. Most likely, when Hynix first arrived, housing values increased, but during periods of retooling or major change (for example, when Hyundai and Hynix split into two different companies) values may have decreased. However, there are other factors, such as the economy, which make Hynix's effect on the market difficult to isolate. But the effect of large companies such as Hynix on the housing market is another valuable issue that could be examined.

With all the controversy and miscommunication in the community, we hope that this compilation and analysis of information regarding what has happened thus far with Hynix can serve as a guide and a tool to help Lane County better understand the effects of development incentives. While the majority of studies find inconclusive or negative economic impacts (not benefits) in regard to development incentives, we feel the fact that such a large net positive impact was discovered is significant. We attribute the uniqueness of our situation to the fact that the city and EWEB managed to minimize their costs in comparison with other development programs. For example, when Kentucky offered Toyota financial backing to open a factory there, they gave them outright cash gifts, and allowed many city organizations to make deals with them in order to minimize the firm's costs. In Eugene, EWEB made it clear that Hynix would pay for any and all new facilities they needed to accommodate their usage, and pay extra for independent contracts to cover their electricity. We suspect strong moves like this one and others were the cost minimizing factors that created a positive economic impact for Eugene-Springfield.

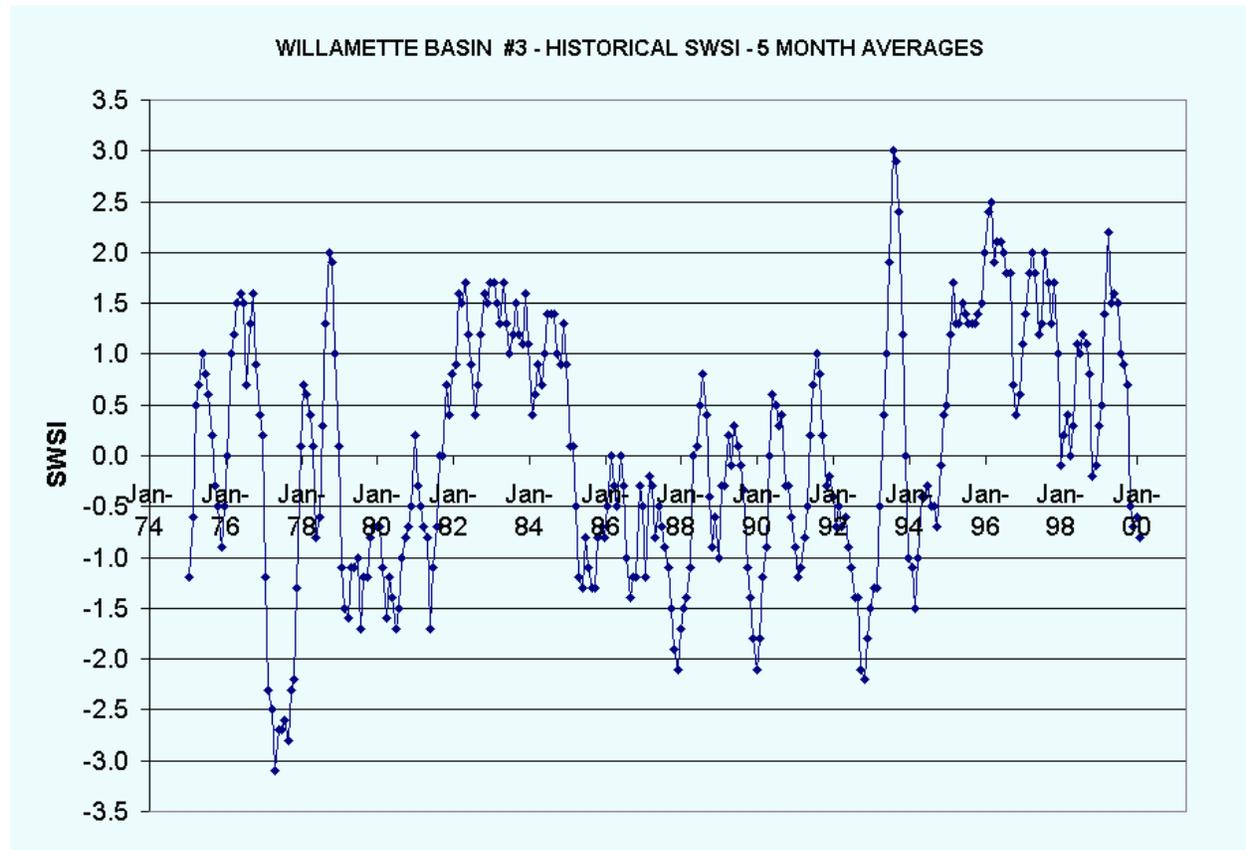
Hopefully, by examining what happened here in the last 5 years, we can discover all the reasons why this situation was different, and use that to Lane County's economic benefit in the future.

**Tables**

Table B: SWSI chart for summers 1997-2002

Year	June	July	August	Annual Summer Average
2002	1.8	2.2	2.5	2.167
2001	-3.2	-3.2	-3.2	-3.2
2000	0	-0.1	-0.2	-0.1
1999	1.6	1.5	1	1.367
1998	1.1	1	1.2	1.1
1997	1.2	1.3	2	1.5
mean	0.42	0.45	0.55	0.55

Graph A: Willamette Basin – Historical SWSI – 5 Month Averages



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