

920144

LEGISLATIVE REFERENCE LIBRARY
HC107.M63 P832 1991
- Cost analyses of the Northwest Air



3 0307 00052 7989

Department of
Economic Development

HC
107
.M63
P832
1991

Pursuant to 1991 Laws, Chapter 350
Article 1, Section 2, Subd 9

Cost
Analyses of the
Northwest Airlines
Heavy Maintenance
and Jet Engine
Repair Facilities

Cost Analyses of the NWA Heavy Maintenance and Jet Engine Repair Facilities

Table of Contents

Final Cost-Effectiveness Analysis of the Public Investment in NWA	1
The Cost-Effectiveness of the Public Investment in the NWA Heavy Maintenance Facility and Related Projects	7
Project Cost Report	26

Final
Cost-Effectiveness
Analysis
of the Public
Investment
in NWA

*Ernie Venegas, Ph.D., Senior Economist,
and Abigail McKenzie, Director
Information Analysis and Evaluation Unit
Business Development and Analysis Division*

***Minnesota Department of
Trade and Economic Development***

*900 American Center Building
150 East Kellogg Boulevard
St. Paul, Minnesota 55101-1421*

612/296-8285

November 18, 1991

Final Cost-Effectiveness Analysis of the Public Investment in NWA

On Nov. 11, 1991 agreement was reached between Northwest Airlines (NWA), the state of Minnesota and other public partners on the financing of NWA's Heavy Maintenance and Jet Repair Facilities, to be located in Duluth and Hibbing. This analysis estimates the cost-effectiveness of the public investment in the project, based on the terms of the agreement. This analysis is an update of the benefit/cost analysis released by the Department of Trade and Economic Development on Sept. 20, 1991.

In this analysis final cost estimates are used, including the addition of a below-market rate loan and a bond to NWA, and updated infrastructure investment costs. The final agreement also included certain assurances and covenants by NWA, including a guarantee that a minimum of 1,500 jobs would be created at the two facilities. As a result, this analysis calculates the benefits of the project based on the guaranteed level of 1,500 jobs. Because employment in the facilities may exceed this guaranteed level, this analysis should be considered the minimum threshold for possible benefits from the project.

Overview of Results

Using the revised cost and benefit estimates, the project remains cost-effective. The present value of the project net of costs is estimated to be \$934 million, yielding \$3.70 for every dollar of social cost (assuming a market rate for capital of 12.5 percent). If the higher market rate for capital of 14.5 percent is used, the net present value of the project is estimated to be \$819 million, yielding \$2.80 for every dollar of social cost associated with the project.

Benefits

As discussed in the original study, *The Cost-Effectiveness of the Public Investment in the NWA Heavy Maintenance Facility and Related Projects*, the primary purpose of the state and public support for the project is to create jobs and income in the relatively high unemployment area of Northeastern Minnesota. As a result, the principal benefits of the project are the wage and salary income generated by the two facilities, during their construction and operation.

Construction phase expenditures on infrastructure improvements have increased by \$3.8 million from previous estimates. As a result, employment and wages have increased by \$2 million in 1992. (Phasing and estimates of these benefits can be found on Table 1, page 2 of the original report.)

During the operations phase, NWA ensures employment of 1,500 in the two facilities, as compared to the earlier projection of 1,900 used in the original analysis. The Heavy Maintenance Facility in Duluth is scheduled to begin operations with 200 employees in spring 1993, reaching the level of employment guaranteed by NWA of 1,000 workers. The

Jet Engine Repair Facility in Hibbing will initially employ 300 people in the spring of 1994 and is guaranteed to reach 500 workers. Both facilities are projected to reach full employment by 1999. As in the original analysis, NWA projects an average annual salary of \$45,000 for workers in both facilities.

As in the original study, the indirect and induced jobs and wages generated from the facilities are estimated using the Minnesota Forecasting and Simulation Model (MFS) from the Minnesota Department of Revenue. Also following the methodology established in the original study, estimates of indirect jobs and wages, created through sales from Minnesota suppliers to the facilities, are corrected for possible displacement effects in areas of full employment. (See page 3 of the original study for a complete discussion of this issue.)

Table 1A Operations Phase Employment and Wages

	<i>Annual Averages</i>				
	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1999</i>	<i>2000</i>
Direct Employment (number of jobs)	150	550	895	1,443	1,500
Indirect Employment (number of jobs)	95	347	564	909	945
Induced Employment (number of jobs)	118	432	702	1,132	1,178
Total Employment (number of jobs)	363	1,329	2,161	3,484	3,623
Direct Wages/Salaries (millions of 1991\$)	\$ 7	\$25	\$40	\$65	\$68
Indirect/Induced Wages (millions of 1991\$) ^a	\$ 3	\$10	\$16	\$26	\$26
Total Wages/Salaries (millions of 1991\$) ^a	\$10	\$35	\$56	\$91	\$94

^a Adjusted for possible displacement of low wage indirect jobs in the Twin Cities.

As displayed in Table 1A, the peak annual wage and salary income generated from the project of \$94 million is \$25 million below the previous estimates. More than 70 percent of total annual wages from the project are from the direct job impacts, with less than 30 percent from indirect/induced job effects.

As part of the final package, NWA has guaranteed to maintain at least 18,000 jobs at its Twin Cities operations. These estimates of wages and salaries do not include the benefits from retaining NWA's headquarters in the state and securing the jobs for the 18,000 workers NWA currently employs.

Present Value of Wage/Salary Benefits

The present value is the estimate of the current value of all the benefits from a project, over its lifetime. (See page 4 of the original study for a more detailed discussion of the calculation of present value.)

As presented in Table 2A, the present value of the wage and salary benefits of the project, based on the guaranteed employment of 1,500 jobs, is estimated to be \$1.284 billion. This is \$263 million, or 17 percent less than the original analysis based on ultimate employment of 1,900 workers at the facilities.

TABLE 2A Present Value of Benefits^a

Average Nominal Long-Term Treasury Rate (1988-1990)	8.7%
---	------

Average Inflation 1988-1990 (GNP Price Deflator)	3.9%
--	------

Net (real) Discount Rate	4.8%
--------------------------	------

Lifetime of Project	30 years
---------------------	----------

Present Value of Wages (millions of 1991\$)

Construction — Direct	\$ 64
Indirect ^b	33
Operations — Direct	851
Indirect ^b	336
Total (millions of 1991\$) ^b	\$1,284

^a Excludes benefits of retaining 18,000 NWA jobs in the Twin Cities Metropolitan Area.

^b Net of displacement effect on indirect jobs in the Twin Cities.

Costs

As in the original study, the principal social costs associated with the project are the financing incentives to NWA and infrastructure improvements required for the facilities. Incentives and financing previously identified are presented and discussed on pages 7 through 10 of *The Cost-Effectiveness of the Public Investment in the NWA Heavy Maintenance Facility and Related Projects*.

However, the final agreement with NWA also includes an additional low-interest loan and a new bond issue for NWA. A loan of \$50 million will be made by the Metropolitan Airports Commission (MAC) from its construction fund. In addition, MAC will issue \$79 million in revenue bonds to be repaid by NWA through lease payments. A reserve fund will be created to back the bonds and reduce the required bond interest rate. As part of the bond reserve, a pledge of \$15 million in interest income from the 2000 Fund is under consideration by the Iron Range Resources and Rehabilitation Board (IRRRB).

The social cost associated with both the loan and bond is the opportunity cost from the foregone return to society had the funds been used for a market-rate investment. It represents the quantitative value of the risk associated with the state and other public partners' involvement in the project. The opportunity cost is calculated by applying the difference between the market-rate for capital and the issuing rate for the loan and bond to the declining balances of these two financing instruments. (A detailed discussion of opportunity cost is presented on page 8 of the original study.)

The true "market-rate" for a similar investment is unknown and a matter of some speculation. While there are clearly risks associated with the project, the state's airline consultant has reported that NWA, and in turn the project, has a reasonable potential for success. For this analysis, market rates of 12.5 percent and 14.5 percent were selected, reflecting a range of returns currently required for "below-investment grade" investments.

An additional social cost is associated with the \$15 million in reserve funds under consideration by the IRRRB. Although the reserve would only be used in a last resort should NWA default on its lease payments, the IRRRB would lose the opportunity to use the \$15 million for alternative investments over the 10-year life of the bond. Although the funds would earn a return while in the reserve, it is low-risk return (e.g. Federal Funds Rate of 5.5 percent) and likely below the rate they could earn from other possible investment strategies for the 2000 Fund. This foregone return is the social cost associated with using the \$15 million for the bond reserve rather than for alternative uses.

In addition, infrastructure investments associated with developing the sites and building the facilities have been refined since the original study was conducted in August. Currently, infrastructure costs are projected to total \$9.8 million, up from the previous estimate of \$6 million.

As presented in Table 3A, the present value of the social costs associated with the project, including the new financing elements and infrastructure costs, are estimated to be \$350 million (assuming a market rate of 12.5 percent) and \$465 million (assuming a market rate of 14.5 percent). These social costs are \$24 million and \$41 million, respectively, above the social costs estimated in the original analysis.

Table 3A Project Costs — 30-year project (millions of 1991\$)

		<i>Total Present Value</i>	
		<i>Market Rate</i>	
<i>Project Incentives</i>	<i>1992^a</i>	<i>12.5%</i>	<i>14.5%</i>
Jobs Tax Credit	-	\$19.5	\$19.5
Sales Tax Refund			
Hibbing	\$ 2.0	4.8	4.8
Duluth	5.2	11.8	11.8
City of Duluth	1.0	1.9	1.9
Opportunity Costs ^b			
Construction	6.0	122.0	166.5
MAC-Bonds	11.2	107.0	168.2
-Loan	1.8	5.4	12.7
IRRRB-Reserve	0.1	5.2	6.7
Additional Incentives			
Duluth	47.6	46.0	46.0
IRRRB ^c	-	8.7	8.7
St. Louis County ^d	-	8.7	8.7
Infrastructure Improvements	9.8	9.4	9.4
Total	\$84.7	\$350.4	\$464.9

a 1992 is assumed to be the first year of the project, and the first year that the state would incur costs associated with the project.

b General obligation bonds and tax exempt bonds only.

c \$10 million in advance lease payments to be provided by IRRRB by 1994.

d \$10 million in advance lease payments to be provided by St. Louis County by 1994.

Benefit/Cost Comparisons

Table 4A presents the benefit-cost comparisons given these new benefit and cost estimates. Assuming a market rate of 12.5 percent, the present value of benefits, net of costs, is \$934 million, yielding \$3.70 for every dollar of social cost. Assuming a market rate of 14.5 percent, the net present value of the project is expected to be \$819 million, yielding \$2.80 for every dollar of social costs associated with the project.

Under either scenario, the project is more than sufficiently cost-effective. These estimates are especially impressive when considering that the benefit estimates are based on only the minimum jobs pledged by NWA that may very well be exceeded.

Table 4A Benefit-cost Comparisons (millions of 1991\$)

	<i>Market Rate</i>	
	<i>12.5%</i>	<i>14.5%</i>
Present Value of Wages	\$1,284	\$1,284
Present Value of Incentives/ Infrastructure Costs	\$350	\$465
Discounted Net Present Value	\$934	\$819
Benefit/Cost Ratio	3.7	2.8

The Cost-Effectiveness of the Public Investment in the NWA Heavy Maintenance Facility and Related Projects

*Ernie Venegas, Ph.D., Senior Economist,
and Abigail McKenzie, Director
Information Analysis and Evaluation Unit
Business Development and Analysis Division*

***Minnesota Department of
Trade and Economic Development***

*900 American Center Building
150 East Kellogg Boulevard
St. Paul, Minnesota 55101-1421*

612/296-8285

September 20, 1991

EXECUTIVE SUMMARY

This study examines the cost-effectiveness of the public investment in the Northwest Airlines (NWA) Heavy Maintenance and Jet Engine Repair Facilities, using social benefit/cost analysis techniques. The study also analyzes the number of years the project would need to pay back the state's and other public partners' direct financial commitment to the project. The study supplements financial analyses of NWA being conducted by the other consultants.

This benefit/cost analysis assumes that facilities operate successfully and NWA performs on its lease payments. Therefore the only cost attributed to the bond financing is the "opportunity cost" associated with issuing the bonds for the project. The financial exposure payback analysis estimates the number of years the project would have to operate to cover the full financial exposure to the state if NWA defaults on its lease payments.

The study quantifies only the benefits associated with the wage and salary income generated by the "direct and indirect" jobs created by the project. Estimates of the value of other project benefits, including stabilizing NWA, securing MSP as a hub airport, and increasing property values in northeastern Minnesota are beyond the scope of this paper. The study assumes the projects would not occur without the public investment.

Benefit/Cost Analysis

- According to NWA projections, the Heavy Maintenance Facility will employ 1,500 workers, and the Jet Engine Repair Facility will employ 400 workers when full employment is reached by year-end 1999. These are net new jobs in the state, in addition to the 3,800 mechanics now employed at the MSP airport.
- The present value of wages and salaries from both projects, over their lifetime, totals \$1.55 billion: \$94 million in construction phase wages and slightly over \$1.45 billion in wages from the operation of the facilities.
- The present value of costs associated with the projects totals \$232 million, including tax and lease payment subsidies, infrastructure improvements, direct construction financing and the opportunity cost associated with bonds issued to build the facilities.
- The net present value of both projects is \$1.32 billion, yielding a benefit/cost ratio of 6.7. Thus, for every dollar of public investment, the project yields more than six dollars in societal benefits.
- If the opportunity cost associated with MAC bond financing is included in the analysis, the net present value of the project is estimated at \$1.22 billion with a benefit-cost ratio of 4.7.

Financial Exposure Payback Analysis

- Total public financial exposure in the Heavy Maintenance and Jet Repair projects is estimated to be \$276 million in 1993 when all of the publicly backed bonds will have been issued, and \$324.2 million in 1998 when all tax credits and other subsidies will have been paid.
- Based on these estimates, cumulative wage benefits from the facilities will exceed public financial exposure after six years, or in 1997. If the \$270 million in MAC general obligation backed revenue bonds are included, cumulative wage benefits exceed public financial exposure in nine years.

SECTION 1

Benefits and Costs of the Northwest Airlines Heavy Maintenance and Repair Facilities

This analysis identifies the primary costs and benefits associated with the Northwest Airlines Airbus A320 and Jet Engine Maintenance Facilities project proposed for Northern Minnesota. This study uses accepted techniques and practices for estimating the cost-effectiveness of public investments. However, a complete social benefit/cost analysis would identify all the economic impacts of a project to society, while in this report, only the wage and salary benefits and incentive and infrastructure costs associated with the project are quantified. Possible additional benefits of the projects are presented and discussed only qualitatively. The study assumes the projects would not occur without the public investment.

This study supplements the financial analysis being conducted by the airline consultant for the State on the financial viability of NWA. As a result, this analysis does not deal with financial issues relating to the company.

Benefits

The primary motive for the state to support the NWA Maintenance Facilities projects is to create jobs and income in the state, specifically in the relatively high unemployment area of Northeastern Minnesota. As a result, the principal benefits of the project are the wage and salary income generated by the projects.

A portion of the increased incomes derived from the projects is captured by state and local governments in the form of income tax, sales tax, property tax, and other taxes and fees. Some argue that when evaluating the economic benefits of the project, only these fiscal benefits (i.e. increased tax revenues) should be considered, because this portion is used to recoup the public costs. However, increased tax revenue is a narrow measure that represents only a minor portion of the overall economic benefits from such a public investment.

Recognizing only the tax revenues ignores other benefits to non-governmental sectors. Because it limits the benefits to the portion that state and local governments can capture, the use of tax revenues (in lieu of total wages and salaries) heavily penalizes public projects in benefit/cost analyses. Government's most important role in economic development is to provide an environment where businesses can be successful so they can create more jobs for Minnesotans. The correct approach to benefit-cost analysis measures **all** incomes produced by the project as benefits, which are then compared with total project costs.

The assumptions and procedures used to calculate the wage and salary benefits of the project are presented below. Wage and salary benefits from the project are generated from the **direct, indirect** and **induced** jobs created by the project. The indirect jobs and wages are generated through sales from Minnesota suppliers to the facility; the induced effects come from increased consumer expenditures due to increased personal incomes in the project area and the state. The Department of Revenue's Minnesota Forecasting and Simulation Model (MFS) is used to estimate the indirect and induced jobs and wage impacts from the projects.

Construction Phase

Construction employment generated by building the two facilities is estimated from the MFS Model and is based on projected construction expenditures provided by NWA. Construction costs are projected to total \$250 million for the heavy maintenance facility and \$100 million for the Jet Engine Repair Facility. Expenditures will be phased and employment generated as displayed in Table 1.

Table 1 shows that during the peak year of the construction phase (1993), total annual employment generated from the project is estimated to be 1,751 employees, while total annual wage and salary income is estimated to be \$41 million, in 1991 dollars.

TABLE 1 Construction Phase Employment and Expenditures

	1992	1993	1994	1995
Expenditures (millions of 1991\$)	\$144 ^a	\$150	\$12	\$50
Direct Employment (number of jobs) ^b	1,231	1,193	57	477
Indirect Employment (number of jobs) ^c	168	162	8	65
Induced Employment (number of jobs) ^d	409	396	19	158
Total Employment (number of jobs)	1,808	1,751	84	700
Direct Wages (millions of 1991\$)	\$28	\$27	\$1	\$11
Indirect/Induced Wages (millions of 1991\$) ^e	15	14	1	6
Total Wages (millions of 1991\$)^e	\$43	\$41	\$2	\$17

^a Includes infrastructure development (access roads, etc.) at \$3 million for each site.

^b Salaries based on NWA estimates that plant and other buildings comprise 60 percent of total construction costs in Duluth and 30 percent of total construction expenditures in Hibbing. The remainder of construction costs are equipment in the plants that are produced elsewhere.

^c Suppliers to the construction industry.

^d Effect of increased consumer incomes and expenditures.

^e Adjusted for possible displacement of low wage indirect jobs in the Twin Cities.

Operations Phase

The Heavy Maintenance Facility in Duluth is scheduled to begin operations with 200 employees in Spring 1993, reaching full operational employment of 1,500 by the end of 1999. The Jet Engine Repair Facility in Hibbing will initially employ 300 people in Spring 1994 and 400 people when it reaches full operations at the end of 1999. NWA projects an average annual salary of \$45,000 for workers at both facilities.

According to NWA officials, 3,800 mechanics are now employed at Minneapolis-St. Paul International Airport. While some of the aging 727s are likely to be phased out, the total size of the NWA fleet will certainly continue to grow. According to company data, a net increase of 3,700 mechanics company-wide is projected by year 2000, after excluding hires for promotions, attrition, etc. An estimated 1,500 of this net increase will work at the Heavy Maintenance Facility. Thus, for this analysis all of the jobs at the two facilities are considered as new jobs in the state.

According to standard benefit/cost techniques, any jobs generated by a project in areas of full employment are considered to displace the alternative new jobs in the area because of labor supply constraints. In other words, in areas of full employment there would not be enough workers available to fill all the jobs if a new project increased the demand for workers in the area. As a result, the least attractive/poorest paying jobs are likely to go unfilled. In this case of more jobs than workers, the full wage and salary benefits from the project should not be counted. Instead, only the income **above** the average wage for those least attractive jobs should be counted. For the purposes of this analysis, we use the minimum wage as the wage for displaced jobs.

In the case of the Heavy Maintenance Facility and Jet Engine Repair projects, direct jobs and most of the induced jobs are created in an area of relatively high structural unemployment, so the full income could be counted. However, many of the indirect jobs will be generated in the Twin Cities, an area of full employment. As a result, the minimum wage is netted out of these wage benefits. Because the indirect jobs created by the project are largely in the manufacturing sector, they tend to be relatively high wage/high skill jobs. Thus, the net benefit from indirect employment, after correction for displacements, remains substantial as displayed in Table 2. Approximately 65 percent of indirect jobs are assumed to be generated in the Twin Cities, because the area accounts for roughly 65 percent of the state's manufacturing employment.

TABLE 2 Operations Phase Employment and Wages

	<i>Annual Averages</i>				
	1993	1994	1995	1999	2000
Direct Employment (number of jobs)	150	550	885	1,790	1,900
Indirect Employment (number of jobs)	95	347	558	1,128	1,197
Induced Employment (number of jobs)	118	432	695	1,405	1,492
Total Employment (number of jobs)	363	1,329	2,138	4,323	4,589
Direct Wages/Salaries (millions of 1991\$)	\$7	\$25	\$40	\$80	\$85
Indirect/Induced Wages (millions of 1991\$) ^a	\$3	\$10	\$16	\$32	\$34
Total Wages/Salaries (millions of 1991\$)^a	\$10	\$35	\$56	\$112	\$119

^a Adjusted for possible displacement of low wage indirect jobs in the Twin Cities.

As displayed in Table 2, annual average total employment generated by the facilities during their first full year of operation (1995) is estimated to be 2,138 employees; total annual wage/salary income (adjusted for job displacement) are estimated to be \$56 million (1991\$). Total direct employment in the two facilities is projected by NWA officials to grow through 1999, to reach a peak combined direct employment of 1,900 workers at the end of the decade.

Present Value of Wage/Salary Benefits

The present value is an estimate of the total value of a project's future benefits if all benefits were received today. The present value of wage and salary benefits from the projects is the value in today's dollars of all wage benefits from the construction and operations phases over the lifetime of the project. Income received in the future has less value than income received today, because income earned today could be invested and earn a "rate of return." Wages and salaries are discounted to correct for this foregone return. Wages and salaries are also likely to grow over time with inflation, and should be increased to account for inflation.

For the purpose of this analysis, a discount rate of 8.7 percent was used reflecting the average annual interest rate on 30-year U.S. Treasury bonds for the period 1988 through 1990. For the purpose of this analysis, the average GNP price deflator for the three-year period 1988-1990 was used as our estimate of the inflation rate that would drive up wages and salaries over the life of the project. The net, or real, discount rate

for calculating the present value of the project's benefits was determined by netting out the inflation from the nominal rate. This results in a net, or real, discount rate of 4.8 percent.

In addition to the discount rate, the life of the project will significantly affect the present value of benefits. The lifetime of the project is estimated to be 30 years. The current life of the Boeing 700 series aircraft has extended nearly 30 years, and it is expected that the Airbus A320 type aircraft will have a similar life span.

As presented in Table 3, the present value of all wage and salary benefits from the project is estimated at \$1.55 billion (1991\$).

TABLE 3 Present Value of Wages/Salaries

Average Nominal Long-Term Treasury Rate (1988-1990)	8.7%
Average Inflation 1988-1990 (GNP Price Deflator)	3.9%
Net (real) Discount Rate	4.8%
Lifetime of Project	30 years
<i>Present Value of Wages (millions of 1991\$)</i>	
Construction — Direct	\$62
Indirect ^a	32
Operations — Direct	1,041
Indirect ^a	412
Total (millions of 1991\$)^a	\$1,547

^a Net of displacement effect on indirect jobs in the Twin Cities.

Other Project Benefits

In addition to the wages and salary benefits, the NWA projects are likely to have other significant benefits for the state. While quantifying the value of these benefits is beyond the scope of this analysis, some of them are briefly discussed below:

- **Increased Property Values**

The entire area of Northeastern Minnesota has experienced declining residential and business property values over the last decade. The increased employment and income to the region are very likely to raise real estate values, especially housing values. While this would negatively affect renters, the benefit to property owners should be substantial.

- **In-Migrants and Labor Force Development**

Some have argued that many of the jobs will go to in-migrants rather than people already living in Minnesota, and thus the benefits from that income should not be included. In fact, many of the initial jobs are likely to go to in-migrants, with specialized skills. However, the increase in wage and salary income for the region and the state is the same regardless of the recipients. Increased income or wealth to the state is the objective of economic development.

Moreover, as Minnesota residents become trained and prepared, they will hold more and more the jobs at the facilities. If we took a position that the only jobs we could induce to a non-urban area were ones that would be immediately filled by the local labor force, the area would be relegated to its current skill level with no hope of improving the training, skill or income for its labor force. In contrast, attracting high skill jobs gives a region in Greater Minnesota the opportunity to increase the skill level, and, in turn, the real income of the region by improving the capabilities of its labor force. Moreover, the NWA projects offer improved long-term job opportunities for young people who wish to remain in the area.

Southeastern Minnesota/Rochester is an excellent example of this approach. The Mayo Clinic and IBM did not locate in the area because the local labor force could immediately meet its needs for medical, scientific and professional staff. Even today, employees with specialized skills are recruited to the companies. Yet, the presence of the Mayo Clinic and IBM has undoubtedly raised the skill level, income, long-term job opportunities and standard of living in that region.

- **Infrastructure Utilization**

The increased population in Northeastern Minnesota will result in increased utilization of public infrastructure such as roads, and education and health care systems. However, Northeastern Minnesota generally has excess public infrastructure capacity resulting from the decade-long decline in the area's population. Thus, any increase in population is likely to benefit the state by reducing under-use of public infrastructure and is unlikely to impose any significant additional cost. For example, although there may be a marginal increase in cost to the state to educate in-migrants' children, it is very unlikely any new schools would be needed to accommodate the expanded population or roads to accommodate increased transportation needs.

Costs

The principal social costs associated with the projects are the financing incentives to Northwest Airlines and infrastructure improvements required for the facilities. The estimates of these project costs are discussed below and displayed in Tables 4 and 5.

In this section, MAC bond financing included in Minnesota Laws Chapter 350 is **not** included. MAC financing is considered a separate project from the Heavy Maintenance and Jet Engine Repair Facilities, with both separate costs and benefits. Section 2 will examine the costs and benefits including the MAC bond financing.

Tax Incentives

Jobs Credits: Northwest Airlines will be awarded corporate income tax credits, against tax liabilities, for each new job created. The job tax credits are for each job created during the first five years of the project. The tax credits are \$5,000 per new job and are applicable to NWA's corporate income tax liability.

Sales Tax Exemption: NWA will receive a refund of all state and local government sales and use taxes paid on equipment and building materials used in the construction of the facility.

Bonding

The state and localities involved in the project have authorized \$302.6 million in bonds for construction of the Heavy Maintenance and Jet Engine Repair Facilities. Additionally, the city of Duluth has committed to a \$47.6 million contribution to the Heavy Maintenance Facility, bringing the total construction funding to \$350.2 million. Of the total bonds authorized for the two projects, \$202.6 million are revenue bonds backed by the state and St. Louis County general obligation guarantees. Another \$65 million in 10-year bonds are backed by a first lien on the Duluth facility but issued on a tax exempt basis. The remaining \$35 million in bonds authorized for Hibbing/Chisholm are backed solely by NWA and issued at market rates. Table 4 presents construction financing for the projects.

TABLE 4 Construction Financing

	<i>Duluth Heavy Maintenance Facility (millions)</i>	<i>Hibbing Jet Engine Repair Facility (millions)</i>
State General Obligation-Backed/NWA Revenue Bonds	\$125.0	\$50.0
St. Louis County General Obligation-Backed/NWA Revenue Bonds	12.6	15.0
City of Duluth Revenue Bonds (Contribution)	47.6	0.0
Tax-Exempt Revenue Bonds, Backed by First Lien on Facilities	65.0	-
Taxable Revenue Bonds Backed by First Lien on Facilities	-	\$35.0
Total Construction Costs	\$250.2	\$100.0

The revenue bonds will be repaid with interest by NWA lease payments. Since NWA rental will repay the bonds, there are no projected direct public costs associated with the bonds. However, there is an “opportunity cost” to society associated with issuing the bonds.

Conceptually, the opportunity cost is the foregone return that society would earn, had the funds been used for an alternative market-rate investment. The opportunity cost can be viewed as the value assigned by private capital markets to the risk the state bears by assuming liability in the project.

The opportunity cost can be calculated as the difference between the interest rate paid by NWA on the state-backed bonds and the rate a private entity would pay to secure the funds at conventional terms. For this analysis, “conventional terms” are assumed to be the market rate required for similar quality bonds, now about 12.5 percent. By subtracting from the 12.5 percent the estimated rate of 6.6 percent that NWA will pay on the state-backed bonds, there is an estimated opportunity cost of 5.9 percent. The opportunity cost for the other bonds is similarly calculated, using the difference between the issuing interest rate and the alternative market rate.

The opportunity cost is calculated by applying this difference to the annual declining balance of the revenue bonds backed by the state and St. Louis County and tax exempt bonds issued by the state. Because the \$35 million in bonds issued by St. Louis County are backed solely by NWA assets and issued at market rates, society has no foregone return. Thus, no opportunity cost is assigned to the \$35 million in bonds issued by St. Louis County.

Table 5 presents the estimated opportunity cost to the state associated with issuing the bonds.

Additional Financing Incentives

As previously mentioned, the city of Duluth will also finance \$47.6 million of the construction of the Heavy Maintenance Facility, to be repaid in part by projected TIF revenues, public utility revenues and other city revenue sources.

The Iron Range Resource and Rehabilitation Board (IRRRB) and St. Louis County have also pledged funds to cover 18 months of lease costs to NWA. This incentive is estimated to total \$20 million, to be repaid to St. Louis County in part by TIF revenues.

Infrastructure Costs

In addition to the financial incentives, the cities of Duluth and Hibbing will need to make modest infrastructure improvements to support the facilities. Infrastructure improvements in Hibbing will include building access roads and other improvements to the Hibbing/Chisholm Airport, costing an estimated \$3 million. Infrastructure improvements in Duluth will include similar road construction and will cost an estimated \$3 million.

Present Value of Costs

Table 5 displays the present value of costs associated with the project. As with benefits, the total cost of the project in today's dollars is estimated by adding all the costs over the lifetime of the project and discounting for the time value of money. Just as wages are not as valuable when received at some future date, incentives are not as costly when paid at a future date, because the state could earn a return on the funds until payments are due. As with calculating benefits from the project, a real discount rate (net of inflation) of 4.8 percent is used, and the lifetime of the project is estimated to be 30 years.

**TABLE 5 Project Costs (excluding MAC Bonding) — 30-year project
(Millions of 1991\$)**

<i>Project Incentives</i>	<i>1992^a</i>	<i>Present Value of Total</i>
Jobs Tax Credit	-	\$20.0
Sales Tax Refund		
Hibbing	\$2.0	\$6.0
Duluth	\$7.0	\$15.0
Bonds-Opportunity Costs ^b		
Construction	6.0	122.0
Additional Incentives (including TIF)		
Duluth	47.6	46.0
IRRRB ^c	-	9.0
St. Louis County ^d	-	9.0
Infrastructure Improvements	6.0	5.0
Total	\$68.6	\$232.0

^a 1992 is assumed to be the first year of the project, and the first year that the state would incur costs associated with the project.

^b General obligation bonds and tax exempt bonds only.

^c \$10 million in advance lease payments to be provided by IRRRB by 1994.

^d \$10 million in advance lease payments to be provided by St. Louis County by 1994.

Benefit/Cost Comparisons

The present value of costs associated with the projects can be compared to the present value of benefits from the projects, to assess whether the projects are a good social investment. As can be seen, the present value of the projects (net of costs) is more than \$1.3 billion over 30 years. Dividing total costs into benefits yields a benefit/cost ratio of 6.7 to 1. More than \$6 in expected income is generated for every \$1 invested by the cities, St. Louis County and the state.

Table 6 presents cost-to-benefit comparisons for the NWA Heavy Maintenance and Jet Engine Repair projects.

**TABLE 6 Benefit-cost Comparisons (Excluding MAC Bonding)
(Millions of 1991\$)**

Present Value of Wages	\$1,547
Present Value of Incentives/ Infrastructure Costs	232
Discounted Net Present Value	1,315
Benefit/Cost Ratio	6.7

SECTION 2

NWA and Metropolitan Airports Commission Financing

The legislation authorizing financing for the Heavy Maintenance and Jet Engine Repair Facilities (Minnesota Laws Chapter 350) also authorizes \$390 million in bonds as a basis for possible mortgaging of NWA assets.

The MAC financing is separate from the Maintenance and Repair projects, and completion of one project does not affect the viability of the other. However, together, they form a larger initiative to ensure NWA's status as a major airline and Minnesota employer, and to secure the status of Minneapolis-St. Paul International as a hub airport.

Benefits

Although this study does not attempt to quantify the potential benefits to the state from the MAC bonding, the benefits are undoubtedly significant. NWA is a major Minnesota employer facing strong competition from other larger competitors. MAC funds are intended to be used by Northwest Airlines to position the company as a major firm in what is an increasingly concentrated industry. Thus, some or all of the income from the 17,500 workers that NWA currently employs in Minnesota could be attributed to the MAC financing.

Moreover, access to a hub airport is very important for many of the state's businesses and is critical to future business location and expansion decisions. Hub status ensures frequent flights and the ability to handle a variety of commercial transportation needs. If Northwest Airlines would go out of business or if it shifted major segments of its operations to its other hubs, MSP could lose its hub status, as Kansas City experienced when TWA left. (In fact, the consulting firm of Airline Economics Inc. told MAC members that it was unlikely that MSP would continue to be a hub if NWA was not headquartered in the state.)

Securing the new maintenance facilities in the state and improving the company's industry position directly secures both the airport's status as a hub and NWA as a major Minnesota employer.

Benefit/Cost Comparisons Including MAC Funding

Table 7 presents benefit-cost comparisons including the opportunity cost associated with MAC bonding. Of the \$390 million in bonding authorization, \$270 million are general obligation revenue bonds backed by MAC, and \$120 million are bonds backed only by NWA and issued at market rates. As in the previous calculation of opportunity costs, the opportunity cost of issuing the MAC bonds only applies to the \$270 million in general obligation backed bonds. The \$120 million of revenue bonds backed by NWA assets are issued at market rates and have no opportunity cost associated with them. The opportunity cost is estimated to be the difference between the rate NWA will pay on the MAC-backed bonds (9.0 percent) and the market rate for capital for similar investments (12.5 percent).

As previously discussed, benefits resulting from the MAC financing are not quantified, and the present value of benefits presented include only the wage and salary benefits previously discussed.

**TABLE 7 Benefit-Cost Comparisons *Including* MAC Financing
(Millions of 1991 \$)**

Present Value of Wages	\$1,547
Present Value of Opportunity Cost of MAC Backed Revenue Bonds	94
Total Present Value of Public Costs	326
Discounted Net Present Value of Project	1,221
Benefit/Cost Ratio	4.7

Even when including these additional costs, the project is extremely cost-effective. The present value of the project, after netting out costs, is over \$1 billion, and the ratio of benefits to costs is 4.7 to 1.

SECTION 3

Financial Exposure Payback Analysis

As discussed, these analyses estimate the costs and benefits of the projects, assuming that the facilities would operate as designed and NWA would perform on its financial lease obligations.

It is important to calculate the number of years that the facilities will need to operate to produce enough benefits to offset the direct costs to the state and local governments and to cover the financial exposure of these entities related to the project, should NWA fail or default on its lease payments. This analysis does not examine social costs, but rather, calculates the benefits necessary to cover the state's and localities' direct financial liability in the project.

The direct financial contributions from the state and localities to the project include the sales tax refunds on construction materials and equipment, job tax credits, and direct contributions to the project such as roads and other infrastructure development. Up-front contributions to the project include \$47.6 million pledged by the city of Duluth for construction of the Heavy Maintenance Facility and prepaid lease payments pledged by St. Louis County and the IRRRB. The public would also be financially responsible for the revenue bonds backed by the general obligation guarantee of the state, St. Louis County and the MAC if NWA defaulted on the lease payments.

As displayed in Table 8, the direct financial exposure of the public partners from these liabilities is estimated to total \$162.6 million (excluding MAC) in 1992, increasing to \$308.8 million in 1995 upon completion of the facilities and \$324.2 million in 1998 when all tax subsidies have been paid out.

Table 8 also presents cumulative wage and salary benefits from the project. According to these estimates, total wage and salary benefits from the direct, indirect and induced jobs will exceed the financial exposure of the public entities by the sixth year of the project, which is three years before the facilities reach full employment, year 2000. An additional \$119 million in benefits are estimated to accrue each year for another 21 years, through year 2021. This analysis assigns no value to the facilities that the state would receive as assets if NWA defaults on the leases.

**TABLE 8 Financial Exposure And Cumulative Benefits
Excluding MAC Bonds (Millions of Dollars)**

	<i>Publicly Backed Bonds</i>	<i>Cumulative Direct Cost + Backed Bonds</i>	<i>Cumulative Benefits</i>	<i>Difference</i>
1992	100.0	162.6	43.0	-119.6
1993	102.6	275.9	94.1	-181.9
1994	-	300.5	130.6	-169.9
1995	-	308.8	202.8	-106.0
1996	-	315.0	273.8	-41.2
1997	-	322.3	358.5	36.2
1998	-	324.2	457.1	132.9
1999	-	324.2	569.5	245.3
2000	-	324.2	688.8	364.6
2001	-	324.2	808.1	483.9
2002	-	324.2	927.4	603.2
2003	-	324.2	1,046.7	722.5
2004	-	324.2	1,166.0	841.8
.
.
.
2021	-	324.2	3,194.2	2,870.0

Payback Including MAC-backed Bonds

Again, when the total initiative is considered and MAC financing is included, the financial exposure of the public partners would increase by \$270 million, or the value of the bonds backed by MAC, to \$594.2 million in 1998. Based on this estimate of total financial exposure, cumulative project benefits exceed the public partners' total direct financial liability related to the project in nine years, or by year 2000. Table 9 presents the financial exposure and cumulative project benefits, including MAC bonding.

**TABLE 9 Financial Exposure and Cumulative Benefits
Including MAC Financing (Millions of Dollars)**

	<i>Publicly Backed Bonds</i>	<i>Cumulative Direct Costs + Backed Bonds</i>	<i>Cumulative Benefits</i>	<i>Difference</i>
1992	370.0	432.6	43.0	-389.6
1993	102.6	545.9	94.1	-451.9
1994	-	570.5	130.6	-439.9
1995	-	578.8	202.8	-376.0
1996	-	585.0	273.8	-311.2
1997	-	592.3	358.5	-233.8
1998	-	594.2	457.1	-137.1
1999	-	594.2	569.5	-24.7
2000	-	594.2	688.8	94.6
2001	-	594.2	808.1	213.9
2002	-	594.2	927.4	333.2
2003	-	594.2	1,046.7	452.5
2004	-	594.2	1,166.0	571.8
2005	-	594.2	1,285.3	691.1
.
.
.
2021	-	594.2	3,194.2	2,600.0

Conclusion

The study quantifies the primary costs — financing incentives and infrastructure improvements — and wage and salary benefits associated with the project. The net present value of the project (net of project costs) is estimated to exceed \$1.3 billion (1991\$) or a benefit-cost ratio of 6.7. Thus, for every dollar invested by the state and local partners in the project, more than \$6 are estimated to be generated in increased salaries and wages.

Total wages and salaries from the direct, indirect and induced jobs are expected to exceed the financial exposure of the state and local partners in the Northern Minnesota projects, including all direct subsidies and publicly backed bonds, by the sixth year of the project.

When the total initiative is considered and MAC's general obligation backed financing is included, the present value of the project net of costs exceeds \$1.2 billion, and more than \$4 in benefits is projected for every \$1 of costs. The public's financial exposure in the initiative, including \$270 in MAC general obligation backed bonds, will be covered after nine years of project operations, in year 2000.

Moreover, this analysis does not include an estimate of the many other benefits associated with the project including securing NWA as a major Minnesota employer, ensuring MSP's status as hub airport, and increased property values and skill levels in Northeastern Minnesota.

Project Cost Report

*Paul Moe, Director
Agriculture and Economic Development Program
Community Development Division*

*Minnesota Department of
Trade and Economic Development*

*900 American Center Building
150 East Kellogg Boulevard
St. Paul, Minnesota 55101-1421*

612/297-1391

November 18, 1991

Duluth Heavy Maintenance Facility

I. Facility Construction

(estimate of the total state, metropolitan, and local capital costs and method of financing)

<i>Cost (millions)</i>	<i>Funding Sources (millions)</i>			
	<i>State G.O. Backed NWA Revenue Bonds</i>	<i>St. Louis Co. Backed NWA Revenue Bonds</i>	<i>City of Duluth Revenue Bonds</i>	<i>First Lien Tax-exempt Revenue Bonds</i>
\$250.0	\$125.0	\$12.6	\$47.6	\$64.8

II. Additional Improvements

(estimate of airport and off-airport improvements)

<i>Cost</i>	<i>Funding Sources</i>		
	<i>Economic Development Authority Grant</i>	<i>Local Bond Issue</i>	<i>NWA</i>
Water retention basin	\$ 400,000	\$ 276,000	\$124,000
Access taxiway	160,000	96,000	64,000
Parking lot	600,000	360,000	240,000
Access road	1,050,000	630,000	\$ 420,000
Intersection repair	255,000	153,000	102,000
Sanitary sewer	578,000	311,000	267,000
Waterline	460,000	276,000	184,000
Gasline	285,000	-	285,000
TOTAL	<u>\$3,788,000</u>	<u>\$2,102,000</u>	<u>\$1,258,000</u>

III. Tax Credits

(estimate of the total state, metropolitan, and local tax credits for the project)

Local sales tax credit ¹	\$ 2,010,000	Local sales tax credit for materials used in construction and equipment purchases.
State sales tax credit ²	13,065,000	State sales tax credit for materials used in construction and equipment purchases.
Jobs tax credit ³	14,875,000	Jobs tax credit for new jobs created.
TOTAL	<u>\$29,950,000</u>	

- (1) Local sales tax refund of 1 percent on local sales and use taxes paid on building materials used in construction and equipment purchases. This local sales tax credit is granted by separate authority by the city of Duluth. An estimated \$201,000,000 will be invested in building materials and equipment.
- (2) The state sales tax refund of 6.5 percent on state sales and use taxes paid on building materials used in construction and equipment purchases. An estimated \$201,000,000 will be invested in building materials and equipment.
- (3) The job tax credit is based on a \$5,000 tax credit for each new job created for the next five years. Northwest has pledged to create a minimum of 1,000 new jobs. The tax credit will be available for 850 jobs created during the five year period 1993-1997.

Hibbing Engine Repair Facility

I. Facility Construction

(estimate of the total state, metropolitan, and local capital costs and method of financing)

<i>Cost (millions)</i>	<i>Funding Sources (millions)</i>		
	<i>State G.O. Backed NWA Revenue Bonds</i>	<i>St. Louis Co. Backed NWA Revenue Bonds</i>	<i>Taxable Revenue Bonds</i>
\$100.0	\$50.0	\$15.0	\$35.0

II. Supplemental Lease Payments

(to retire non-state backed bonds)

<i>Total (millions)</i>	<i>Sources (millions)</i>	
	<i>IRRRB Funds</i>	<i>St. Louis Co. Tax Increment</i>
\$20.0	\$10.0	\$10.0

III. Additional Improvements

(estimate of airport and off-airport improvements)

	<i>Cost</i>	<i>Funding Sources</i>			
		<i>Economic Development Authority Grant</i>	<i>IRRRB Grant</i>	<i>Local Bond Issue</i>	<i>Federal Aviation Admin. Grant</i>
Waterline	\$1,000,000	\$ 600,000	\$150,000	\$ 250,000	-
Gasline	1,165,000	700,000	170,000	295,000	-
Sewerline	800,000	480,000	120,000	200,000	-
Road improvements	400,000	240,000	60,000	100,000	-
Improve taxiway	1,700,000	-	-	170,000	\$1,530,000
Additional hangars	350,000	-	-	35,000	315,000
Remodel aviation area	275,000	-	-	27,500	247,500
Drainage improvements	300,000	-	-	30,000	270,000
TOTAL	\$5,990,000	\$2,020,000	\$500,000	\$1,107,500	\$2,362,500

IV. Tax Credits

(estimate of the total state, metropolitan, and local tax credits for the project)

State sales tax credit ¹	\$ 5,200,000	State sales tax credit for materials and equipment used for construction.
Jobs tax credit ²	9,500,000	Jobs tax credit for new jobs created.
TOTAL	\$14,700,000	

(1) The state sales tax credit is based on a refund of 6.5 percent on state sales and use taxes paid on equipment and materials used in the construction of the facility. It assumes \$80,000,000 invested in equipment and materials.

(2) The job tax credit is based on a \$5,000 tax credit for each new job created for the next five years. Northwest has pledged to create a minimum of 500 new jobs. The tax credit will be available for 460 jobs created during the five year period 1994-1998.