Final Economic Impact Analysis of the Proposed Kalama Manufacturing & Marine Export Facility

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Prepared for:

NW Innovation Works

ECONorthwest
ECONOMICS • FINANCE • PLANNING

Robert Whelan

222 SW Columbia Street

Suite 1600

Portland, OR 97201

503.222.6060

Introduction

Background

NWIW proposes the development and operations of a methanol production facility at the port of Kalama, adjacent to the city of Kalama—a city of 3,878 in Cowlitz County, Washington.[1] Northwest Innovation Works (NWIW) engaged ECONorthwest for an economic impact analysis.

The economic impact analysis estimates the effects the development will have on employment, wages, businesses, and incomes in the local economy. For this report, the word "local" means most of Southwest Washington and the Portland metro area.

This report follows from a 2015 study and is intended to provide updated impacts. While this report is neither offered nor intended to augment any ongoing environmental analysis related to the Kalama facility, it is intended to provide updated impact figures of interest.

Since 2015, due to regulatory requirements and in response to public input, the facility's design has been modified. These modifications, along with delays in construction start and associated impacts, mitigation efforts and regulatory conditions have driven increases to cost estimates.

The production, storage and offloading elements overall are referred to as the Kalama Manufacturing and Marine Export Facility (KMMEF). It will occupy a 90-acre site on land owned by the Port of Kalama. The site is along the Columbia River, 35 miles north of the City of Portland, Oregon, and three miles from Northwest Pipeline—the primary artery for natural gas transmission to the Pacific Northwest.

Methanol, also known as methyl alcohol, is a simple alcohol that occurs naturally in the environment through anaerobic bacterial fermentation.[2] The KMMEF will produce it from natural gas.

[1] Washington State Office of Financial Management, Small Area Estimate Program (SAEP), 2019.

[2] https://ww2.arb.ca.gov/our-work/programs/alternative-fuels/alternative-fuels-methanol

The methanol will be stored on-site and then transferred onto oceangoing vessels for export to Asia. The methanol will then be made into materials, such as synthetic fibers and compounds widely use by consumers and industries.

Key Findings

- Over the full three years of construction, the project will create 1,434 full-year equivalent jobs (FYEs). Of these, 1,121 FYEs will be construction workers including 256 pipefitters, 108 electrical workers, and 128 apprentices.
- In April 2020 the twelve-county region has a labor force of almost 1.6 million and an unemployment rate of 14.2 percent. In Cowlitz County the unemployment rate is 15.7 percent.
- During construction, $728 million would be spent on local labor, goods, fees, sales taxes, and services. Net of sales taxes, local spending will be about $682.9 million, affecting over $1.2 billion in economic output in the twelve-county region through the indirect impacts (spending by businesses and governments) and induced impacts (spending by persons).
- NWIW will employ 192 full-time workers, including executive and administrative staff, at its plant. Payroll, which includes all benefits, taxes, wages, salaries, and other similar expenses, will be about $21 million per year.
- The average job would see $109,000 in wages and benefits. ECONorthwest estimates wages and salaries would average $72,338.[3]
- In total, 994 jobs per year are linked to the KMMEF operations. This total includes the 192 at the plant itself, indirect jobs from vessel calls, and all of the indirect and induced jobs elsewhere in the economy of the twelve-county region.

[3] Calculated by applying the 34.8 percent benefit load on total compensation of private sector manufacturing workers in the United States as reported by the US Bureau of Labor Statistics Employer Costs for Employee Compensation survey May 2020.

- NWIW has committed to invest annually in carbon mitigation projects with an emphasis on opportunities located within Washington State and Southwest Washington. An assumed $15 million invested in an average Washington remediation project would have the effect of supporting 131 jobs, $8.7 million in labor income, and $25.2 million in total economic output in the State of Washington,

Impact Analysis Parameters

ECONorthwest divides the impact analysis into two parts. The first covers the impacts of plant construction on the 90-acre site at the Port of Kalama. The second analysis measures the impacts of an average year of plant operations.

Construction will span three years. ECONorthwest estimated the economic impacts of construction by year and in total. The direct impacts encompass construction at the 90-acre site by NWIW and its contractors.

KMMEF plans on starting construction in late 2021 or early 2022 depending on regulatory approvals and ending in 2024. Full-scale operations are expected to begin in 2025 after a short ramp-up period. The plant will run at full capacity producing 3.6 million metric tons per year (MMTY) requiring about sixty vessel calls a year.

NWIW provided ECONorthwest plant construction costs and operating expenses expressed in 2020 dollars. For consistency, all dollar amounts in this report are expressed in 2020 dollars.

Affected Region

By definition, the direct impacts of plant construction and operations occur at the plant site. The direct impacts trigger subsequent indirect and induced impacts throughout the regional economy.

ECONorthwest defines the local economy as twelve counties within less than a 90-minute drive under good conditions. This is a reasonable area for counting KMMEF's impacts on businesses, jobholders, and households. The area consists of the following counties:

- Cowlitz County, Washington
- Clackamas County, Oregon
- Clark County, Washington
- Columbia County, Oregon
- Lewis County, Washington

- Multnomah County, Oregon
- Pacific County, Washington
- Skamania County, Washington
- Thurston County, Washington
- Wahkiakum County, Washington
- Washington County, Oregon
- Yamhill County, Oregon

The twelve-county (local) region has a large labor pool of almost 1.6 million workers.[4] ECONorthwest expects and assumes in the impact analysis that all the workers at the plant in a typical operating year would be local residents. For the construction phase, some jobholders will come to Kalama temporarily, usually for specialized work, from outside the twelve local counties. These are called itinerant workers and have little impact on the local labor pool.

[4] US Bureau of Labor Statistics. Local area unemployment statistics. Data extracted June 1, 2020 for the year 2019.

Economic Impacts from Construction

Construction projects stimulate economic impacts. They do so by spending money on goods and services, and by providing jobs. ECONorthwest calculated the economic impacts of the KMMEF construction project on the twelve-county region. The first step in this analysis is to determine how much the construction project would cost and how much of that would go to local businesses and workers.

Construction Value and Local Content

Methanol plant construction is a major undertaking. KMMEF would be the first methanol plant on the West Coast. As such, much of the equipment and engineering work necessary will come from outside the local region.

NWIW will ship some major components into Kalama. This includes reactors, compressors, air separation units and distillation columns. Local labor will unload them from ships and install them at the jobsite, but the work going into building these large components will be done elsewhere. This type of equipment is not locally available.

Other aspects of constructing the methanol plant are readily available from local sources. Underground civil works, steel, concrete, piping, fabricated metal products, and industrial pumps are ample and manufactured in the region. Heavy industry is a dominant sector. The region ranks 17th nationally in manufacturing employment versus other metropolitan areas.[5]

Total Construction Costs

NWIW anticipates spending $2.3 billion (in 2020 $) to construct the plant. ECONorthwest estimated the portion of total construction costs subject to the 7.8 percent retail sales tax in Cowlitz County in accordance with Washington law.[6] ECONorthwest estimates the retail sales tax would be about $59.4 million as shown in Table 1.

[5] Helper, S., T. Krueger, and H. Wial. "Location of American Manufacturing: Trends in the Geography of Production" Brookings Metropolitan Program. (2012).

[6] WAC 458-20-170(4)(a)

Table 1: KMMEF Total Construction Cost, Millions 2020$

Construction Costs (Mn. $)	Project Total	Local Spending
Engineering & related professional fees	$ 104.0	$ 4.2
EPC excluding equipment installation	546.0	213.8
EPC equipment installation	370.5	238.6
Air separation units	190.0	-
Methanol storage tanks	154.0	13.9
Control system	16.7	-
Equipment rental, cranage	51.2	35.3
Loading arm	4.2	-
Emergency shutdown system	3.9	-
Civil engineering work including pilings	138.9	97.2
Distillation columns, other equipment	555.6	-
Sales tax on construction*	59.4	45.1
Miscellaneous consumables	105.6	79.9
Total Construction Costs	$ 2,300.0	$ 728.0

Source: NWIW August 2020 estimates.
** Impact analysis excludes taxes in the calculation of economic impacts.*

Relevant to economic impact analysis are the purchases of goods, services, and labor from the local region; those are locally sourced direct impacts. These affect the local economy causing indirect impacts on businesses and induced impacts on households. ECONorthwest estimates about $728 million in labor, goods, and services spending will come from the local area. About $682.9 million will be spent locally net of sales tax.

Local Labor Market

Kalama is in an area with a large labor market. According to the US Bureau of Labor Statistics (BLS), in April 2020 the twelve-county region has a labor force of almost 1.6 million and an unemployment rate of 14.2 percent. Cowlitz County has a 15.7 percent unemployment rate, which suggests greater slack in the labor market near Kalama.

Table 2: Labor Force Size and Unemployment Rate by County in the Local Region, April 2020, BLS

County/State	Labor Force	Unemployment Rate
Cowlitz, WA	48,734	15.7%
Clackamas, OR	218,893	13.7%
Clark, WA	244,084	13.8%
Columbia, OR	24,583	15.5%
Lewis, WA	37,334	16.3%
Multnomah, OR	462,719	15.6%
Pacific, WA	9,420	17.0%
Skamania, WA	5,556	14.4%
Thurston, WA	150,169	14.9%
Wahkiakum, WA	1,383	13.2%
Washington, OR	318,457	12.0%
Yamhill, OR	54,798	13.1%
12-County Region	1,576,130	14.2%

Source: US Bureau of Labor Statistics, May 2020. Subject to updates.

While the size of the labor market is large, BLS data also reflect the depth of skills. Table 3 is a list of the non-supervisory workers at the KMMEF construction jobsite by BLS occupation code. The data compare the workers needed for building the KMMEF to the most recent numbers of workers in each key occupation in the region.[7] In all cases, the number of individuals working in each occupation exceeds what is needed at the Kalama methanol construction site by four times or more.

[7] Source: BLS Occupational Employment Statistics for Portland-Vancouver-Hillsboro MSA, Cowlitz and Thurston Counties, Washington and Non-Metropolitan SW Washington. Data exclude engineers, managers, and longshoremen.

Table 3: Construction Labor Occupations Needed for KMMEF Versus Working in the Region in May 2019, BLS

Construction Workers	Needed at KMMEF	Working in the Region	Occupation Code
Expeditor / Materials Clerk	20	6,700	43-5071
Equipment Operator	51	3,490	47-2073
Millwright	77	770	49-9044
Iron Workers	45	900	47-2221
Riggers	32	140	49-9096
Pipefitter	256	4,760	47-2152
Welder	256	4,290	51-4121
Electrical / Control	109	8,840	47-2111
Carpenter	32	13,350	47-2031
Mason	38	290	47-2021
Apprentices	128	1,150	47-3011-19
Laborer	77	11,510	47-2061
	1,121	56,190	

Sources: NWIW and estimates from the US Bureau of Labor Statistics

According to NWIW, construction will take 36 months, starting in either late 2021 or early 2022 depending on regulatory approvals. Work ends in late 2024 and includes about 90 days of ramping production up and checking systems. Full production starts in early 2025.

ECONorthwest assumes a start date of January 2022 for the economic impact analysis. Impact analyses measure employment in full-year equivalents (FYEs). One FYE equals twelve months of work per person. It can be full time or part time, although in construction most work is full time. Some jobs will last more than a year, while others may last only a few months.

During the three years, Kalama will experience an employment surge. Peak employment will happen in 2023 with 831 FYEs. Over the full three years, the project will employ 1,434 FYEs This includes managers, supervisors, engineers, and others overseeing the work of the 1,121 trade workers on the project. Table 4 shows the number of FYEs each year.

Table 4: Total Employment Engaged in Building the KMMEF Project, FYEs Spread Over Three Years

Year	Total Jobs	From Local Labor Force
2022	305	272
2023	831	741
2024	298	266
Total	1,434	1,279

Sources: NWIW and calculations by ECONorthwest

The workforce includes many from the construction trades as well as engineers, project managers, shipping, and administrative support personnel. In addition, some manufacturers installing equipment at KMMEF may use their own employees on-site. The economic impact analysis does not count those workers as direct hires of the project although their jobs may be picked up in the analysis as indirect employment.

Because of the large number of highly qualified construction workers and managers living in the local region, the analysis estimates that 1,279 of the 1,434 FYEs needed will be local residents. The remaining 155 will work from outside of the region or come to Kalama temporarily for their jobs.

Local and Itinerant Construction Labor

Workers hired for plant construction spend their incomes, which brings local economic impacts. Itinerant workers bring smaller impacts than those that both live and work locally. Therefore, knowing the share of itinerants is important for the impact model.

Based on Census data, we expect about 10.8 percent of the workforce will be itinerant.[8] In addition to their pay, these workers typically receive *per diems* which are living allowances to help workers pay for local housing, meals, and incidentals. Because *per diems* will mostly be spent at businesses in and near Kalama, they count as local direct impacts for the impact analysis; however, itinerant worker pay is not. Most will spend their pay at businesses outside the local area where they live.

Where money is spent matters in impact studies. As this analysis measures only impacts occurring in the twelve-county local area, non-local direct impacts were separated out. The largest non-local purchases will be specialized manufacturing equipment. Most materials, fuels, fees, and services used in building the KMMEF will be spent locally.

Wages and benefits earned by local workers will have local direct impacts, as will about $5.3 million in *per diems.* As a matter of convention in impact studies, taxes are excluded from impact analyses and are not shown under the local direct impact column on Table 5.

Table 5: Construction Project Total Versus Local Direct Impact

KMMEF Construction Costs (Mn. $) & Job Years of Labor	Total	Local Direct Impact
Materials, equipment, fuel, fees & services	$ 2,013.2	$ 479.5
Local labor, wages & benefits	222.1	198.1
Labor per diems for transient workers	5.3	5.3
Sales tax*	59.4	-
Total Construction	$ 2,300.0	$ 682.9
Labor (FYEs)	1,434	1,279

** By convention, direct economic impacts exclude sales tax.*

ECONorthwest isolated the local impacts by counting only jobs held by residents of the twelve-county region as direct. Technically, all jobs are considered direct. By excluding non-local jobholders from direct impacts, the economic impact analysis is more accurate and avoids overstating household spending.

[8] U.S. Census Bureau, Center for Economic Studies, Longitudinal-Employer Household Dynamics Program. 2013. OnTheMap Application. Retrieved June 15, 2015 from http://onthemap.ces.census.gov

Results of Economic Impact Analysis of Construction

ECONorthwest used the 2017 version of IMPLAN for this analysis, which is the most current model available. We built the model to reflect the economic geography of NWIW's twelve-county region. ECONorthwest made the appropriate inflation adjustments in the model and the data provided by NWIW to describe the results in 2020 dollars. This aligns with the standard that NWIW uses for its construction budgeting.

The analysis shows that the $2.3 billion project will spend $682.9 million in the 12-county region. Of this, $203.4 will go towards worker wages, benefits, and *per diems*.

Table 6: Local Economic Impacts of KMMEF Plant Construction

Impacts	Total Project Costs and Employment	Local Direct Impacts	Local Indirect Impacts	Local Induced Impacts	Total Local Impacts
Output (Mn. 2020 $)	$ 2,300.0	$ 682.9	$ 117.0	$ 404.9	$ 1,204.8
Labor Income (Mn. 2020 $)	227.4	203.4	43.8	136.0	383.2
Employment (FYEs)	1,434	1,279	650	2,690	4,619

Note: Direct local employment excludes jobs held by non-residents.

As is typical of major industrial construction projects in the region, labor impacts will be large because the region has a deep, skilled labor pool. And due to that, the families of these workers will spend most of their earnings in the local market, which will trigger additional economic impacts. Based on the IMPLAN model, a total of 4,619 FYEs will be supported throughout the local economy compared to 1,279 FYEs at the construction project — a multiplier ratio of 3.6.

In total, the region will see $1.2 billion in total economic output, $383.2 million in labor income, and 4,619 FYEs over a span of three-years.

Economic Impacts from Operations

KMMEF will start full-scale operations in 2025. Operations involve local purchases and employment, which in turn cause economic impacts. For purposes of calculating these impacts, ECONorthwest used operating estimates from NWIW for an average year. As with the construction analysis and to maintain consistency, values are expressed in 2020 dollars.

Operating Parameters and Employment

The economic impact model ECONorthwest built for KMMEF operations runs off the payroll and goods and services forecast from NWIW. As with construction, only plant expenditures going to local workers and businesses count as having effects on the twelve-county regional economy.

Value of Output

The most basic parameter for operations is the value of output. ECONorthwest calculated this value using an economic model. In most impact studies, output drives the economic impact forecast; however, that is not the case for this analysis.

Since there are no comparable methanol plants in the region, or the entire West Coast, ECONorthwest ran its analysis using the KMMEF operations payroll and local spending forecast. The value of direct output completed the analysis but has no effect on determining local economic impacts, as it is not the value of production but the value of local spending the plant injects into the local economy that matters.

The plant will produce 10,000 metric tons of methanol a day or about 3.6 million metric tons per year. NWIW is anticipating exporting all the output, which will be shipped out of Kalama. In doing so, the Port of Kalama will benefit from additional, high-paying jobs and some onshore spending by the 60 or so oceangoing vessels making calls every year.

The average list price of methanol is about $360 a metric ton.[9] Accounting for that price and KMMEF's expected production, the annual value of the plant's direct output would be almost $1.3 billion.

[9] Methanex U.S. reference price June 2019 - May 2020 average.

Methanol is a commodity with fluctuating export price and demand. The value of the plant's output will vary. What is shown in this analysis is illustrative of the operation's size, but the local impacts are not contingent upon that value.

Direct Operating Labor

NWIW will employ 192 full-time workers, including executive and administrative staff, at its plant. Payroll, which includes all benefits, taxes, wages, salaries, and other similar expenses, will be about $21 million per year.

Given that the twelve-county region is defined as encompassing a 90-minute or less driving range from KMMEF, ECONorthwest expects all 192 employees to live within commuting distance of Kalama.

Because the local area has a large manufacturing base, there is ample labor skilled in the occupations needed. ECONorthwest compared the needs for various occupations at KMMEF with the supply of workers in the local economy. In all occupations, as shown on Table 7, there is an ample labor pool.

Table 7: Occupations and Employees for Plant Operations at KMMEF Versus Local Availability in May 2019, BLS

Plant Operations Employees	Needed at KMMEF	Working in the Region	Occupation Code	BLS Occupation Title
Administration				
General Manager	1	29,850	11-1021	General & Operations Managers
HR Manager	1	1,910	11-3121	Human Resources Managers
Procurement	2	5,480	13-1020	Purchasing Agents, Except Wholesale, Retail, & Farm Products
Sales Manager	1	5,200	11-2022	Sales Managers
Manager	1	3,120	11-3010	Administrative Services Managers
Accounting	4	11,940	13-2011	Accountants & Auditors
IT Manager	2	5,200	11-3021	Computer & Information Systems Managers
Specialist	5	17,950	13-1198	Business Operations Specialists, All Other
Assistant	3	4,700	43-6011	Executive Secretaries & Executive Administrative Assistants
Clerical/Office support	12	29,300	43-9061	Office Clerks, General
Technical Management				
Plant Manager	1	2,200	11-3051	Industrial Production Managers
Production Manager	1	6,580	11-9198	Managers, All Other
Maintenance Manager	1	6,580	11-9198	Managers, All Other
HSE Manager	1	190	17-2111	Health & Safety Engineers, Except Mining Safety Engineers & Inspectors
Technical Staff				
Process Engineer	2	4,192	17-2112	Industrial Engineers
Laboratory Supervisor	1	420	19-2031	Chemists
Laboratory	11	890	19-4099	Life, Physical, & Social Science Technicians, All Other
Production Staff				
Shift Supervisor	4	6,550	51-1011	First-Line Supervisors of Production & Operating Workers
Control Room Operator	12	340	51-8091	Chemical Plant & System Operators
Process Operator U&O	20	190	51-8093	Petroleum Pump System Operators, Refinery Operators, & Gaugers
Operator	16	3,960	51-9199	Production Workers, All Other
Security Guard	8	7,970	33-9032	Security Guards
Maintenance Staff				
Mechanical Engineer	2	3,740	17-2141	Mechanical Engineers
E&I Engineer	2	3,130	17-2071	Electrical Engineers
Draftsperson/Planner	2	500	17-3013	Mechanical Drafters
Workshop Foreperson	4	240	49-9069	Precision Instrument & Equipment Repairers, All Other
Mechanic	30	4,750	49-9041	Industrial Machinery Mechanics
Welder	7	5,370	51-4121	Welders, Cutters, Solderers, & Brazers
E&I Technical Foreperson	9	520	49-9012	Control & Valve Installers & Repairers, Except Mechanical Door
Electrical Foreperson	1	890	49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment
Instrumentation	18	1,850	49-9099	Installation, Maintenance, & Repair Workers, All Other
Logistics				
Store Supervisor	1	1,130	43-5011	Cargo & Freight Agents
Store Person	6	7,280	43-5071	Shipping, Receiving, & Traffic Clerks
Total	192	184,112		

Sources: NWIW and the US Bureau of Labor Statistics

Operating Expenses

The largest operating expense for a methanol plant is natural gas. All the natural gas used in Kalama is produced outside of the region. More specifically, essentially all the gas feedstock for the facility will originate from the Montney formation in Alberta and British Columbia, Canada. The second-largest expense is ocean shipping, which is not local either. Therefore, the two largest inputs have no local economic impacts. Most of the other goods and services that KMMEF will need each year are available locally in whole or part.

In whole, electricity and water utility services are entirely local purchases. So are the Port of Kalama services of dock fees and land leases, which collectively total almost $4.9 million.[10]

Partially supplied from the local economy are machinery, maintenance, and overhead costs, totaling about $32.3 million per year. Other large expenses that come from a mix of local and non-local sources include insurance, office expenses, administrative services, and sales costs.

Catalysts, absorbents, and other materials used to manufacture methanol are made primarily outside of the local economy. However, there are some local impacts because local wholesalers and shippers in the supply chain may be involved. The economic impact model estimates these local inputs and they contribute indirect impacts.

Vessel Calls

Based on the probable size of oceangoing vessels and the production volume at KMMEF, the Port of Kalama will see an estimated 60 vessel calls a year. Each vessel call stimulates local spending.

ECONorthwest contacted the Port of Kalama, Pacific Ship Supply, the Fort Vancouver Seafarers Center, and maritime union organizations and determined the amount of spending in the local economy from vessel calls.

In total, because of vessel calls, in the local economy about $3.5 million would be spent annually employing nearly 24 workers. Most of the spending would be for river and bar pilot services. Other major spending impacts are dockage fees, longshoremen, berthing, ship supplies, and on-shore personal spending by ship crewmembers.

Spending from vessels calls is an indirect impact, which in turn stimulates additional indirect and induced spending in the local economy. ECONorthwest added these impacts to the plant's operating impacts.

[10] Land lease is on a sliding scale as the project develops. ECONorthwest used $1,540,143 per year for the impact analysis. This lease rate is reached in month 61 and continues thereafter.

Results of Economic Impact Analysis of Operations

Table 8 summarizes the total economic impacts anticipated annually from KMMEF on the twelve-county economy. Direct output is large because of the high value of the plant's exports. Indirect output, at $98.6 million, is comparatively small since most of the inputs used for making methanol originate from outside of the local economy.

Table 8: Annual Local Economic Impacts of KMMEF Operations

Impacts	Direct	Indirect	Induced	Total
Output (Mn. 2020 $)	$ 1,296.0	$ 98.5	$ 47.3	$ 1,441.7
Labor Income (Mn. 2020 $)	21.0	32.6	17.3	71.0
Employment (FYEs)	192	462	340	994

In total, 994 jobs per year are linked to the KMMEF operations. This total includes the 192 at the plant itself, indirect jobs from vessel calls, and all the indirect and induced jobs elsewhere in the economy of the twelve-county region.

Living Wage

With 192 employees and total compensation of $21 million, the average job would see $109,437 in wages and benefits at the plant. ECONorthwest estimates wages and salaries would average $72,338.[11] That is about $9,000 higher than the living wage for a family in Cowlitz County. The average annual wage at KMMEF will be over $21,000 more than the average annual pay of all jobs in Cowlitz County.

[11] Calculated by applying the 34.8 percent benefit load on total compensation of private sector manufacturing workers in the United States as reported by the US Bureau of Labor Statistics Employer Costs for Employee Compensation survey May 2020.

Table 9: Compensation at KMMEF and Living Wages

Per KMMEF employee:	
Wages & salaries	$ 72,338
Benefits & payroll taxes	37,099
Total compensation	$ 109,437
Cowlitz County:	
Family living wage	$ 63,362
Average wage	50,680

Sources: Economic Policy Institute and U.S. Census

Fiscal Impacts

As noted in the operations analysis, the Port of Kalama will receive about $4.9 million per year in dockage fees and land lease payments. The large value of KMMEF results in other sizable fiscal impacts for state and local governments.

State and Local Tax Revenues

In this section, ECONorthwest calculates three streams of government revenues: business and occupation taxes (B&O), sales tax, and property tax. Actual taxes paid may differ from what is calculated here because of changing tax rates, tax laws, and accounting. Therefore, the figures provided here are approximate.

Business and Occupation Tax

Washington imposes a gross receipts tax on businesses, which is known as the business and occupation (B&O) tax. The tax rate is applied to the gross proceeds of sales or gross income. Rates vary by type and industry with some exemptions.

Construction companies pay between 0.471 or 0.484 percent B&O tax based on the value of construction less sales taxes. Engineering and architectural services are sometimes exempt.[12] If not taxed at the construction contractor level, such service businesses pay up to 1.75 percent. ECONorthwest uses these rates for this analysis and estimate the State would collect about $11.8 million in B&O taxes over the three-year construction period.

Washington imposes a B&O tax on methanol plant production. The basic tax rate for methanol is 0.484 percent of the wholesale value of production. The price of methanol rises and falls with international market conditions, but based on the value of output forecast in Table 8, ECONorthwest estimates the annual B&O tax will be about $5 million annually.

[12] RCW 82.04.051(4)

Sales and Use Tax

Washington imposes a 6.5 percent sales and use tax. Cowlitz County has a 1.3 percent sales and use tax. KMMEF is exempt from collecting taxes on the methanol it exports. Washington does not impose sales and use taxes on goods manufactured in the state and exported to other states or countries.[13]

However, NWIW will have to pay sales and use tax on the construction of KMMEF. The tax applies to the value of the construction after some exemptions (*e.g.,* the value of reused goods and concrete forming lumber). Plant construction will generate an estimated total of about $59.4 million in sales tax over three years of which $9.9 million would go to Cowlitz County and $49.5 million to the State of Washington.

Not included in the NWIW taxable construction spending is $20.6 million in dock construction paid by the Port of Kalama. That amount includes $1.5 million in sales tax.

Once operating, the plant will pay sales and use taxes for supplies, fuel (notably natural gas consumed at the plant for energy), and maintenance services. ECONorthwest estimates annual sales and use taxes paid by the operations of $1.28 million to Cowlitz County and $6.4 million to Washington.

Leasehold and Hazardous Substance Taxes

Since KMMEF will lease land from the Port of Kalama, it will not have to pay property taxes on that land; however, there is a 12.84 percent leasehold excise tax in lieu of property tax when a lessee leases from a government owner. Once fully operating, annual payments will be $1.5 million with a leasehold excise tax of $192,600. Lease payments will increase over time with inflation and so too will the State leasehold excise taxes.

In addition, Washington imposes a 0.7 percent hazardous substance tax on the value of methanol production, which ECONorthwest estimates would be $1.286 billion in 2018. Thus, the tax would be about $9 million a year.

[13] WAC 458-20-193(6)(a)

Property Tax

Washington law requires county assessors to appraise industrial properties at 100 percent of their true and fair market value.[14] Machinery and equipment affixed to real property is considered real property. If it is not affixed, it is counted as personal property.

Assessors then use a trending guide, which accounts for remaining useful life, in determining true market value. As for the land, NWIW will lease, not own the property on which the plant would be erected, so there is no property tax on the land itself.

Assessing real estate, particularly industrial property, is complex and beyond the scope of this analysis. However, for the purpose of estimating property tax on KMMEF, ECONorthwest uses the cost to construct ($2.3 billion). The assessor may determine a different value depending on what is included and excluded but $2.3 billion is a reasonable estimate for the historical cost.

The true and fair market value is calculated from the historical cost. It is the historical value times the percent good factor that is provided annually by the Washington Department of Revenue.

Taxes paid are based on the fair market value times the mill levy rates (property tax rates).

Property Tax Assuming No Change in Mill Levy Rates

ECONorthwest used the 2020 levy rates in tax code area 715 based on KMMEF's proposed location. Should rates be the same in the year after the plant is constructed, property taxes assed on it would be about $22.6 million, as shown in the column for the first year on Table 10. That equals 16 percent of the total 2020 property taxes levied by Cowlitz County.[15]

[14] WAC 458-07-030

[15] Cowlitz County Office of Assessments. Annual Report 2021 Assessment Year for Taxes Payable in 2020.

Table 10: Property Tax Estimate Using 2020 Levy Rates

Tax Authority	2020 Mill Levy Rate	KMMEF 1st Year Property Tax	KMMEF 10th Year Property Tax
State Schools	2.91314	$ 6,130,710	$ 3,189,309
Cowlitz County Current Expense	1.57032	3,304,749	1,719,192
State Veterans Relief	0.01125	23,676	12,317
Human Services Mental Health	0.02500	52,613	27,370
County Road	1.37145	2,886,226	1,501,468
Kalama School District #402	3.52845	7,425,616	3,862,943
Kalama Fire District #5	1.23633	2,601,856	1,353,534
Rose Valley Cemetery Dist. #6	0.06363	133,900	69,657
Total Property Tax	10.71957	$ 22,559,345	$ 11,735,790

Note: This analysis assumes 2020 levy rates apply to the methanol plant.

In later years, the plant's assessed value falls in accordance to Washington Department of Revenue schedules. Plant and equipment additions and replacements will add to the taxable property, but the degree that they would is uncertain and, thus, not included.

In the tenth year, the plant's taxable value drops to about $1.09 billion and property taxes, if levy rates stay the same as they were in 2020, total $11.7 million. However, levy rates are subject to changes and industrial plant values decline as they depreciate over time

A more likely scenario is that the addition of a large, new taxpayer (KMMEF) would lower the tax rates paid by all other property taxpayers in the County.

Property Tax After Levy Rates are Reduced

Table 11 shows what would happen if government budgets remain the same but are spread over a larger pool of taxable assessed values. This would happen once KMMEF comes on the property roll and if government budget remains unchanged.

Table 11: First-Year Property Tax Estimate After Levy Rates Fall

Tax Authority	2020 Mill Levy Rate	KMMEF 1st Year Property Tax	Reduced Mill Levy Rates	Property Tax with Reduced Levy Rates
State Schools	2.91314	$ 6,130,710	2.90875	$ 6,121,474
Cowlitz County Current Expense	1.57032	3,304,749	1.33331	2,805,941
State Veterans Relief	0.01125	23,676	0.01125	23,676
Human Services Mental Health	0.02500	52,613	0.02500	52,613
County Road	1.37145	2,886,226	1.03414	2,176,342
Kalama School District #402	3.52845	7,425,616	1.34931	2,839,613
Kalama Fire District #5	1.23633	2,601,856	0.46598	980,657
Rose Valley Cemetery Dist. #6	0.06363	133,900	0.01597	33,608
Total Property Tax	10.71957	$ 22,559,345	7.14370	$ 15,033,923

Using 2020 tax rates, assessed values, and the addition of the taxable assessed value of KMMEF, we estimate that rates in tax district 715, where the plant would be located, would fall from 10.71957 to 7.1437 per $1,000 in assessed property value. Therefore, KMMEF would pay about $15 million in property tax. Importantly, the taxes charged on everyone's property in Cowlitz County would fall. For example, in the case of a home worth $250,000 in tax district 715, the lower tax rate would save the homeowner about $890 a year.

Rates fall because they are calculated by taking the budgets of government departments, like the Kalama School District, and dividing them by the total taxable assessed value in the district. Adding KMMEF to the tax rolls greatly increases the total taxable assessed value and rates fall for all taxpayers in Cowlitz County, but especially for those living in Kalama.

While ECONorthwest can estimate the impact of the plant on taxable assessed values, it cannot predict levy rates. Doing so requires knowing how the budgets of the Kalama School District, Cowlitz County, and other local jurisdictions would change. Those are budgetary decisions.

However, it is clear that having a new, large taxpaying property does offer the community more leeway for setting higher budgets without raising tax rates for existing homeowners and businesses.

Carbon Mitigation Impacts

On a global basis, KMMEF will reduce CO2 emissions (CO2e). That is because methanol made at KMMEF will displace methanol made from coal at plants in Asia. Additionally, coal-based plants release far more CO2 into the atmosphere than KMMEF would emit with natural gas and access to renewable electricity. However, if one counts only emissions inside the State of Washington, the KMMEF plant will emit a calculable and monitored level of CO2e annually. Because of this, NWIW proposed a voluntary greenhouse gas mitigation program to bring their in-state emissions to net-zero annually.

NWIW is interested in understanding the potential economic effects of their voluntary greenhouse gas mitigation program. The intent of the program is to account for and mitigate all the emissions generated, directly and indirectly, from in-state KMMEF operations through investments in carbon reducing projects. Broadly, this "carbon neutral" approach is intended to exceed the requirements of Washington's Clean Air Rule, though the program is currently suspended, while providing an avenue for economic development in the state.

Carbon offsets provide a unique approach to greenhouse gas (GHG) mitigation in that offsets provide a flexible approach to carbon abatement and have the potential to accelerate carbon reduction technologies and generate co-benefits to local economies, rather than simply raising the costs of emitting.

Carbon offset programs aren't without their controversy. The timing of carbon mitigation may occur at a different point in time than when the credit is purchased, which raises questions about the proposed neutrality of current emissions. Additionality, whether the investment induces the mitigation efforts can make the actual impact of offsets difficult to measure.

Despite the limitations, Offsets can be an effective tool for financing low-carbon projects, especially efforts tied to mitigating non-point emissions, such as pollutants associated with land use. Livestock management, reforestation, low-carbon transportation solutions and energy efficiency investments are all types of projects that fall within the purview of carbon offset programs.

Many of these mitigation measures are rightly considered through the lens of avoided costs to society. They can also have ancillary benefits for local job growth while meeting sustainable economic development goals.

Economic effect from carbon mitigation investments

Final in-state emissions baselines and assumptions are still under review by the Washington state Department of Ecology with regard to annual mitigation requirements. For illustrative purposes, however, we can use the conclusions reached in the SEPA Final Supplemental Environmental Impact Statement produced by Cowlitz County and the Port of Kalama in August, 2019. That report concluded in-state direct and indirect annual emissions applicable to the proposed KMMEF mitigation plan of 0.96 million metric tons[16].

Likewise, we recognize the lack of a mature carbon offset market in the state of Washington and the broad range of offset pricing internationally. Applied to the proposed mitigation program preference for in-state projects with blended out of state and international project choices necessary for budgeting and planning over time, we can utilize a rounded California carbon allowance price of $15/metric ton for representing that assumed rate which also aligns with the rate proposed in 2018 by Initiative 1631 in Washington State. [17].

Assuming a blended mitigation cost of $15 per metric ton of CO2e and annual in-state emissions of approximately 1 million metric tons, NWIW would invest approximately $15 million per year in carbon mitigation projects, again, with an emphasis on opportunities located within Washington State and Southwest Washington in particular. With the right mix of projects, especially those that require skilled labor, these investments can provide additional economic opportunities to the labor force in the region.

[16]Kalama Manufacturing and Marine Export Facility SEPA Final Supplemental Environmental Impact Statement August 2019 Page 3-27 Table 3-8. Proposed Project Average Annual Life-Cycle GHG Emissions (million metric tonnes/annum)

[17] Will defer on best citation here to validate that rounded "blended" and/or I-1631 rate of $15. Secondnature.org appears to be a good clearinghouse for pricing data but there may be a better validator for the assumption and price point.

California took the lead setting carbon offset standards and creating markets for credits. Carbon offset programs in Washington are not as fully developed as those in California. For instance, there is no formal market for buying in-state credits. So, at this time, there is uncertainty about the types and locations of carbon offset investments that would be available to KMMEF. For those investments that do occur in Washington, there is also uncertainty about which of those projects would meet the existing protocols used to calculate offsets.

As a result, this analysis cannot quantify the total economic effect of NWIW's portfolio of carbon mitigation investments. However, we do know which industries are likely to be impacted should those investments occur in Washington, and how those industries broadly contribute to the state's economy.

Remediation Project Multipliers

Based on that information, we can calculate the multiplier effects for an "average" remediation project. For the State of Washington, the multiplier effects of workers in the remediation industry are:

- 1.68 – economic output
- 1.73 – labor income
- 2.02 – employment

Multipliers reflect the degree to which each dollar spent recirculates in the study region. Higher multipliers suggest that purchases of goods and services for a given industry tend to occur within the study area, while lower multipliers suggest the opposite.

The way to interpret these multipliers is if the multiplier for output is 1.68, this means that an additional $1 million in projects tied to environmental remediation would yield an additional $680,000 in economic activity for a total of $1,680,000 in the state.

For the labor income multiplier of 1.73, this suggests that for every $1 million paid to remediation project workers, an additional $730,000 is supported in the economy through additional consumption spending on local goods and services.

Employment multipliers are like spending multipliers but interpreted slightly differently. The employment multiplier of 2.02 indicates that each full-year job working on a remediation project in Washington will result in there being another 1.02 jobs in Washington.

Multipliers per $1 Million Spent on Remediation Projects

Multiplier are also expressed on a per million dollars basis. That is, for every million dollars spent on an "average" remediation project, the total effect on the state's economy would be:

- $1,682,000 – economic output
- $583,000 – labor income
- 8.7 – full-year equivalent jobs

Using these multipliers, $15 million invested in an average Washington remediation project would have the effect of supporting 131 jobs, $8.7 million in labor income, and $25.2 million in total economic output in the State of Washington. These are estimates because final effects will depend on what types of remediation projects would be available to KMMEF.

Broader benefits of abating carbon

The economic development potential for investments in carbon offset projects tend to add value to the region in which the work is performed. A broader perspective for the justification of investing in these projects is that the damage from excess carbon emissions are larger than any jurisdiction or economic region. On the other hand, that can mean that investment in Greenhouse gas (GHG) reducing projects can result in benefits that accrue to society more broadly.

As an example, a project that reduces air pollution can result in improvements to public health, including reducing stroke and respiratory issues that lead to long-term health problems.

One method that is used to calculate the potential benefits of carbon abatement is the Social Cost of Carbon (SCC), which quantifies the economic damages associated with an additional ton of GHG being emitted into the atmosphere. The SCC is used by public and private agencies to help measure the efficiency of investment and inform policy decisions.

This analysis does not weigh the benefits and costs of any particular investment NWIW may make, but we can quantify the potential benefits to society from the illustrative $15 million investment in carbon offset projects each year. This is particularly useful in assessing out of state or international projects of particular focus during earlier years where in-state opportunities will be more limited.

Using the existing trading floor price of $16.7 per ton for a carbon allowance in the California market, we calculate that NWIW's investments would equate to the purchase of 0.90 MMTY in abated GHG emissions. The standard methodology for discounting future damages uses a three-percent discount rate to arrive at avoided costs.[18] We calculate, using that method, that NWIW's illustrative $15 million investment in carbon offsets could generate $37.8 million in avoided costs annually.

[18] Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. 2016. "Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866"