



Workforce and Community Impacts of Environmental Initiatives at the Port of Seattle

Appendices

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Appendix A: Policies Driving Change

Global Energy Transition & Ecological Restoration

The country and much of the globe have bold climate goals with net-zero or at least significant reductions in carbon emissions coalescing around the year 2050. To meet these goals, the pace of the energy transition away from fossil fuels must increase, driving multiplied efforts towards increasing clean energy production capacity and developing new options. There is additional pressure put on this transition by the need to make supply chains more resilient to trade interruptions such as those during the pandemic, as well as the war in Ukraine and the rapid movement of Europe away from energy supplied by Russia.

There is a recognition that in addition to decarbonizing the global economy, there is also a need to restore ecosystems that have been degraded through human action. There is a global movement to restore crucial ecosystems, including coastal waters like Puget Sounds, with 115 countries pledging to restore one billion hectares.¹

US Federal Government

In the US, the federal government has made historically large investments in clean energy and climate change mitigation through the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law) and the Inflation Reduction Act (IRA). In addition to investment in clean energy and climate change mitigation, this legislation also funds local ecological restoration projects to accomplish Biden's target of conserving 30% of the nation's lands and waters by 2030.²

Washington State

Washington State has emerged as a leader in emission reduction policy. The state's 2021 Energy Strategy (adopted in 2019) outlined recommendations that have since been passed into law, including, among others:

- Clean Energy Transformation Act (CETA) requires utilities to be carbon neutral by 2030 and carbon-free by 2045³
- Climate Commitment Act (CCA), a carbon emissions cap-and-invest program⁴

- Clean Fuel Standards⁵
- Healthy Environment for All (HEAL) Act, comprehensive environmental justice and energy equity requirements for state agencies⁶
- Washington Clean Buildings Performance Standards⁷

In addition, the State of Washington seeks to move beyond the No Net Loss (NNL) of critical habitats policy to a Net Ecological Gain (NEG) standard in state law.⁸ This would require public development projects to restore habitats and encourage private development projects to do so.

Appendix B: Detailed List of Occupations, Demographics, and Wages

Find interactive dashboards here:

- [Occupations](#)
- [Wages](#)
- [Demographics](#)

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
Offshore Wind Energy	Project Development	Land Acquisition, Asset Management, and Logistics	Property, Real Estate, and Community Association Managers	High school diploma or equivalent	3,460	\$47.56	\$105,706	24%	59%	30%
		Trades & Technicians	Environmental Science and Protection Technicians, Including Health	Associate's degree	620	\$26.39	\$64,854	30%	49%	19%
			Geological Technicians	Associate's degree	92	\$26.31	\$58,822	23%	29%	
	Turbine Component Manufacturing	R&D	Aerospace Engineering and Ops. Technologists & Techs	Associate's degree	317	\$45.16	\$88,962	33%	18%	33%
		General Manufacturing	Aircraft Structure, Surfaces, Rigging, and	High school diploma or equivalent	4,075	\$30.58	\$68,297	41%	33%	28%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Systems Assemblers							
			Computer Numerically Controlled Tool Operators	High school diploma or equivalent	1,937	\$31.50	\$71,074	24%	7%	23%
			Miscellaneous Assemblers and Fabricators	High school diploma or equivalent	17,242	\$20.15	\$44,554	41%	38%	22%
		Engineers, Designers, & Drafters	Architectural and Civil Drafters	Associate's degree	2,601	\$29.18	\$65,790	22%	26%	20%
			Civil Engineering Technologists and Technicians	Associate's degree	1,888	\$36.68	\$75,026	29%	22%	25%
			Electrical and Electronics Drafters	Associate's degree	246	\$32.56	\$74,776	20%	25%	22%
			Mechanical Drafters	Associate's degree	1,672	\$32.27	\$75,899	20%	19%	25%
		Managers	Life, Physical, and Social Science Technicians, All Other	Associate's degree	1,090	\$32.10	\$70,054	35%	52%	15%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
		Mechanics & Operators	Welding, Soldering, and Brazing Machine Setters, Operators, & Tenders	High school diploma or equivalent	435	\$25.54	\$49,037	31%	10%	21%
			Electrical, Electronic, and Electromechanical Assemblers	High school diploma or equivalent	7,968	\$21.42	\$49,483	50%	50%	31%
			Engine and Other Machine Assemblers	High school diploma or equivalent	839	\$24.86	\$56,576	20%	14%	31%
			Machinists	High school diploma or equivalent	7,278	\$29.30	\$61,818	23%	4%	33%
		Trades & Technicians	Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	7,340	\$28.11	\$60,403	29%	6%	18%
			Electrical and Electronic Engineering Technologists and Technicians	Associate's degree	3,065	\$37.37	\$77,667	32%	17%	30%
			Engineering Technologists	Associate's degree	2,338	\$40.99	\$83,242	30%	21%	26%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+		
			and Technicians, All Other									
			Environmental Engineering Technologists and Technicians	Associate's degree	377	\$38.78	\$72,426	28%	21%	24%		
			Industrial Engineering Technologists and Technicians	Associate's degree	933	\$32.58	\$73,382	32%	20%	30%		
			Mechanical Engineering Technologists and Technicians	Associate's degree	880	\$30.84	\$71,074	30%	21%	28%		
			Installation Vessel Construction	Construction	Construction Laborers	No formal educational credential	32,859	\$23.71	\$56,638	37%	6%	14%
				Administrative	Bookkeeping, Accounting, and Auditing Clerks	Some college, no degree	39,538	\$23.64	\$52,270	23%	89%	37%
					First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	32,365	\$31.47	\$73,944	27%	68%	26%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Office Clerks, General	High school diploma or equivalent	59,253	\$21.77	\$47,902	32%	85%	29%	
			Production, Planning, and Expediting Clerks	High school diploma or equivalent	18,610	\$30.38	\$60,715	29%	57%	24%	
			Secretaries and Administrative Assistants	High school diploma or equivalent	39,901	\$23.95	\$51,272	21%	96%	35%	
			Shipping, Receiving, and Inventory Clerks	High school diploma or equivalent	19,361	\$21.31	\$47,861	39%	32%	20%	
			Engineers, Designers, & Drafters	Architectural and Civil Drafters	Associate's degree	2,601	\$29.18	\$65,790	22%	26%	20%
				Drafters, All Other	Associate's degree	411	\$30.02	\$70,200	23%	23%	23%
				Mechanical Drafters	Associate's degree	1,672	\$32.27	\$75,899	20%	19%	25%
			Mechanics & Operators	Grinding and Polishing Workers, Hand	No formal educational credential	440	\$19.22	\$46,259	34%	15%	23%
				Grinding/Lapping/Polishing/Buffing Machine Setters, Operators & Tenders	High school diploma or equivalent	1,718	\$20.26	\$44,595	28%	15%	29%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Helpers-- Installation, Maintenance, and Repair Workers	High school diploma or equivalent	1,694	\$19.50	\$44,242	42%	8%	13%
			Helpers-- Production Workers	High school diploma or equivalent	2,644	\$18.13	\$40,227	54%	28%	23%
			Industrial Machinery Mechanics	High school diploma or equivalent	9,236	\$31.40	\$69,514	24%	3%	31%
			Layout Workers, Metal and Plastic	High school diploma or equivalent	474	\$36.42	\$74,912	42%	15%	28%
			Machinists	High school diploma or equivalent	7,278	\$29.30	\$61,818	23%	4%	33%
			Model Makers, Metal and Plastic	High school diploma or equivalent	345	\$29.06	\$73,839	28%	19%	27%
			Molding/Core-making/Casting Machine Setters Operators & Tenders	High school diploma or equivalent	2,532	\$19.11	\$43,451	29%	17%	25%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Motorboat Mechanics and Service Technicians	High school diploma or equivalent	787	\$25.08	\$54,496	11%	2%	25%
			Supervisors of Mechanics, Installers, and Repairers	High school diploma or equivalent	15,422	\$39.58	\$86,112	20%	7%	29%
			Supervisors of Production and Operating Workers	High school diploma or equivalent	15,170	\$34.30	\$73,819	26%	20%	27%
		Other Support Professionals	Cleaners of Vehicles and Equipment	No formal educational credential	8,436	\$17.32	\$37,648	44%	17%	17%
			Inspectors, Testers, Sorters, Samplers, and Weighers	High school diploma or equivalent	12,563	\$28.65	\$62,816	37%	39%	29%
			Janitors and Cleaners	No formal educational credential	49,468	\$17.99	\$40,997	43%	33%	31%
			Laborers and Freight, Stock, and Material Movers, Hand	No formal educational credential	56,140	\$18.76	\$42,016	40%	22%	17%
			Maintenance and Repair Workers, General	High school diploma or equivalent	36,366	\$23.68	\$53,581	30%	4%	31%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Miscellaneous Assemblers and Fabricators	High school diploma or equivalent	17,242	\$20.15	\$44,554	41%	38%	22%	
			Painters, Construction and Maintenance	No formal educational credential	9,390	\$23.67	\$54,288	43%	13%	18%	
			Production Workers, All Other	High school diploma or equivalent	2,658	\$19.39	\$48,526	43%	33%	21%	
			Upholsterers	High school diploma or equivalent	417	\$23.43	\$53,269	34%	20%	29%	
		Sales		Sales Representatives, Wholesale and Manufacturing	High school diploma or equivalent	35,027	\$34.38	\$81,016	18%	28%	28%
				Stockers and Order Fillers	High school diploma or equivalent	56,843	\$18.39	\$40,560	37%	38%	19%
		Trades & Technicians		Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%
				Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	12,609	\$35.02	\$78,562	22%	2%	15%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	7,340	\$28.11	\$60,403	29%	6%	18%
			Structural Metal Fabricators and Fitters	High school diploma or equivalent	1,681	\$24.64	\$54,662	19%	4%	24%
			Fiberglass Laminators and Fabricators	High school diploma or equivalent	1,448	\$22.51	\$49,254	39%	27%	24%
			Carpenters	High school diploma or equivalent	29,440	\$30.42	\$69,139	32%	4%	17%
			Coating, Painting, and Spraying Machine Setters, Operators, & Tenders	High school diploma or equivalent	3,976	\$23.12	\$56,472	34%	11%	18%
			Crane and Tower Operators	High school diploma or equivalent	1,258	\$38.74	\$82,638	21%	3%	28%
			Cutting/Punching/Press Machine Setters Operators & Tenders	High school diploma or equivalent	2,174	\$22.43	\$50,606	27%	16%	27%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Occupational Health and Safety Technicians	High school diploma or equivalent	516	\$36.67	\$75,795	29%	40%	26%	
			Riggers	High school diploma or equivalent	781	\$34.09	\$69,389	25%	5%	16%	
			Sheet Metal Workers	High school diploma or equivalent	3,616	\$38.45	\$86,112	22%	5%	18%	
			Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	22,729	\$47.03	\$98,280	17%	6%	28%	
			Transportation Workers	Supervisors of Transportation and Material Moving Workers	High school diploma or equivalent	15,567	\$30.20	\$66,893	31%	23%	24%
		Platform Construction & Installation	Construction	Commercial Divers	Postsecondary nondegree award	277	\$82.52	\$156,021	22%	7%	22%
				Construction Laborers	No formal educational credential	32,859	\$23.71	\$56,638	37%	6%	14%
				Engineers, Designers, & Drafters	Operating Engineers and Other	High school	9,020	\$36.94	\$79,414	18%	3%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
		Trades & Technicians	Construction Equipment Operators	diploma or equivalent						
			Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%
			Helpers--Electricians	High school diploma or equivalent	704	\$19.82	\$41,288	38%	6%	8%
			Crane and Tower Operators	High school diploma or equivalent	1,258	\$38.74	\$82,638	21%	3%	28%
			Structural Iron and Steel Workers	High school diploma or equivalent	2,396	\$40.23	\$84,635	27%	4%	15%
			Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	22,729	\$47.03	\$98,280	17%	6%	28%
	Wind Turbine Operations & Maintenance	Trades & Technicians	Wind Turbine Service Technicians	Postsecondary nondegree award	131	\$28.33	\$64,085	21%	9%	
	Energy Distribution & Storage	Mechanics & Operators	Power Distributors and Dispatchers	High school diploma or equivalent	391	\$64.03	\$131,019	14%	10%	

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	Postsecondary nondegree award	515	\$52.82	\$112,549	26%	6%	20%
			Electrical Power-Line Installers and Repairers	High school diploma or equivalent	2,681	\$52.94	\$105,893	15%	3%	16%
			Nuclear Power Reactor Operators	High school diploma or equivalent	505	\$50.14	\$102,939	22%	8%	22%
			Supervisors of Mechanics, Installers, and Repairers	High school diploma or equivalent	15,422	\$39.58	\$86,112	20%	7%	29%
		Sales	Customer Service Representatives	High school diploma or equivalent	53,420	\$21.53	\$48,318	34%	69%	18%
		Hydrogen	R&D, Engineering & Manufacturing	General Manufacturing	Miscellaneous Assemblers and Fabricators	High school diploma or equivalent	17,242	\$20.15	\$44,554	41%
Engineers, Designers, & Drafters	Architectural and Civil Drafters			Associate's degree	2,601	\$29.18	\$65,790	22%	26%	20%
	Chemical Technicians			Associate's degree	1,152	\$24.10	\$54,579	28%	38%	23%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
		Mechanics & Operators	Civil Engineering Technologists and Technicians	Associate's degree	1,888	\$36.68	\$75,026	29%	22%	25%
			Mechanical Drafters	Associate's degree	1,672	\$32.27	\$75,899	20%	19%	25%
			Computer Numerically Controlled Tool Operators	High school diploma or equivalent	1,937	\$31.50	\$71,074	24%	7%	23%
			Control and Valve Installers and Repairers, Except Mechanical Door	High school diploma or equivalent	514	\$45.62	\$93,517	21%	6%	25%
			Electrical, Electronic, and Electromechanical Assemblers	High school diploma or equivalent	7,968	\$21.42	\$49,483	50%	50%	31%
			Gas Plant Operators	High school diploma or equivalent	217	\$89.70	\$86,882	39%	22%	58%
			Industrial Machinery Mechanics	High school diploma or equivalent	9,236	\$62.80	\$69,514	47%	6%	62%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
		Trades & Technicians	Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%
			Helpers-- Electricians	High school diploma or equivalent	704	\$19.82	\$41,288	38%	6%	8%
			Electrical and Electronic Engineering Technologists and Technicians	Associate's degree	3,065	\$74.74	\$77,667	64%	33%	60%
			Environmental Engineering Technologists and Technicians	Associate's degree	377	\$38.78	\$72,426	28%	21%	24%
			Environmental Science and Protection Technicians, Including Health	Associate's degree	620	\$26.39	\$64,854	30%	49%	19%
			Industrial Engineering Technologists and Technicians	Associate's degree	933	\$32.58	\$73,382	32%	20%	30%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
	Operations & Management		Mechanical Engineering Technologists and Technicians	Associate's degree	880	\$30.84	\$71,074	30%	21%	28%
		Land Acquisition, Asset Management, and Logistics	Property, Real Estate, and Community Association Managers	High school diploma or equivalent	3,460	\$47.56	\$105,706	24%	59%	30%
		Construction	Construction Laborers	No formal educational credential	32,859	\$23.71	\$56,638	37%	6%	14%
		Administrative	Paralegals and Legal Assistants	Associate's degree	8,320	\$33.30	\$72,592	28%	84%	21%
		Engineers, Designers, & Drafters	Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	9,020	\$36.94	\$79,414	18%	3%	27%
		Mechanics & Operators	Supervisors of Production and Operating Workers	High school diploma or equivalent	15,170	\$34.30	\$73,819	26%	20%	27%
		Trades	Boilermakers	High school diploma or equivalent	248	\$41.04	\$82,306	19%		

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+		
			Cement Masons and Concrete Finishers	No formal educational credential	5,976	\$29.19	\$69,326	42%	3%	15%		
			Trades & Technicians	Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%	
				Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	12,609	\$35.02	\$78,562	22%	2%	15%	
				Occupational Health and Safety Technicians	High school diploma or equivalent	516	\$36.67	\$75,795	29%	40%	26%	
				Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	22,729	\$47.03	\$98,280	17%	6%	28%	
			Transportation Workers	Heavy and Tractor-Trailer Truck Drivers	Postsecondary nondegree award	41,522	\$28.48	\$60,216	30%	6%	31%	
			Other types of facility construction/conversion from natural gas	Construction	Miscellaneous Construction and Related Workers	High school diploma or equivalent	638	\$28.78	\$58,677	34%	6%	16%
				Mechanics & Operators	Welding, Soldering, and Brazing Machine	High school diploma or equivalent	435	\$25.54	\$49,037	31%	10%	21%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Setters, Operators, & Tenders								
		Trades & Technicians	Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	12,609	\$35.02	\$78,562	22%	2%	15%	
			Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	7,340	\$28.11	\$60,403	29%	6%	18%	
		Hydrogen-to-Fuel Facilities	Mechanics & Operators	Gas Plant Operators	High school diploma or equivalent	217	\$44.85	\$86,882	20%	11%	29%
		Hydrogen Peaker Plant Construction and Hydrogen Storage Conversion	Construction	Miscellaneous Construction and Related Workers	High school diploma or equivalent	638	\$28.78	\$58,677	34%	6%	16%
			Mechanics & Operators	Welding, Soldering, and Brazing Machine Setters, Operators, & Tenders	High school diploma or equivalent	435	\$25.54	\$49,037	31%	10%	21%
				Power Plant Operators	High school diploma or equivalent	422	\$54.05	\$116,397	17%	10%	28%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
Maritime Decarbon		Trades & Technicians	Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	12,609	\$35.02	\$78,562	22%	2%	15%
			Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	7,340	\$28.11	\$60,403	29%	6%	18%
	Hydrogen Transportation - Port to Port	Operations	Automotive and Watercraft Service Attendants	No formal educational credential	3,526	\$17.15	\$37,003	29%	13%	16%
		Engineers, Designers, & Drafters	Ship Engineers	Postsecondary nondegree award	821	\$45.66	\$97,427	28%	7%	16%
		Maritime	Sailors and Marine Oilers	No formal educational credential	1,993	\$56.98	\$59,925	54%	18%	30%
			Captains, Mates, and Pilots of Water Vessels	Postsecondary nondegree award	1,523	\$50.92	\$104,562	18%	9%	23%
	Hydrogen-End Users	Mechanics & Operators	Automotive Service Technicians and Mechanics	Postsecondary nondegree award	12,846	\$24.87	\$56,264	29%	2%	15%
		Fuel Production	Mechanics & Operators	Petroleum Pump System Operators,	High school	240	\$43.18	\$92,435	21%	6%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Refinery Operators, and Gaugers	diploma or equivalent						
	Battery Manufacturing	Trades & Technicians	Electric Motor, Power Tool, and Related Repairers	High school diploma or equivalent	500	\$27.48	\$57,408	25%	4%	25%
	Shipbuilding & Ship Retrofitting	Mechanics & Operators	Welding, Soldering, and Brazing Machine Setters, Operators, & Tenders	High school diploma or equivalent	435	\$25.54	\$49,037	31%	10%	21%
		Trades & Technicians	Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%
			Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	7,340	\$28.11	\$60,403	29%	6%	18%
			Structural Metal Fabricators and Fitters	High school diploma or equivalent	1,681	\$24.64	\$54,662	19%	4%	24%
			Fiberglass Laminators and Fabricators	High school diploma or equivalent	1,448	\$22.51	\$49,254	39%	27%	24%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Helpers--Electricians	High school diploma or equivalent	704	\$19.82	\$41,288	38%	6%	8%
	End-Users of Green Maritime Fuels	Engineers, Designers, & Drafters	Ship Engineers	Postsecondary nondegree award	821	\$45.66	\$97,427	28%	7%	16%
		Maritime	Sailors and Marine Oilers	No formal educational credential	1,993	\$56.98	\$59,925	54%	18%	30%
			Captains, Mates, and Pilots of Water Vessels	Postsecondary nondegree award	1,523	\$50.92	\$104,562	18%	9%	23%
		Trades & Technicians	Electric Motor, Power Tool, and Related Repairers	High school diploma or equivalent	500	\$27.48	\$57,408	25%	4%	25%
	Ports	Operations	Automotive and Watercraft Service Attendants	No formal educational credential	3,526	\$17.15	\$37,003	29%	13%	16%
		Mechanics & Operators	Power Distributors and Dispatchers	High school diploma or equivalent	391	\$64.03	\$131,019	14%	10%	
		Trades & Technicians	Electricians	High school diploma or equivalent	21,334	\$38.77	\$85,197	21%	3%	16%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	12,609	\$35.02	\$78,562	22%	2%	15%	
			Helpers--Electricians	High school diploma or equivalent	704	\$19.82	\$41,288	38%	6%	8%	
			Transportation Workers	Heavy and Tractor-Trailer Truck Drivers	Postsecondary nondegree award	41,522	\$28.48	\$60,216	30%	6%	31%
		Cybersecurity & Analysis	Cybersecurity & Analysis	Computer User Support Specialists	Some college, no degree	21,229	\$31.94	\$71,448	35%	28%	14%
				Computer Network Support Specialists	Associate's degree	4,643	\$39.91	\$86,070	36%	27%	14%
		Responsible Tourism	Hotels & Accommodations	Hotels & Accommodations	Hotel, Motel, and Resort Desk Clerks	High school diploma or equivalent	5,046	\$16.99	\$35,672	37%	67%
Maids and Housekeeping Cleaners	No formal educational credential				23,462	\$16.82	\$35,888	55%	88%	27%	
Restaurants	Restaurants		Bakers	No formal educational credential	5,358	\$18.02	\$39,146	43%	57%	23%	
			Bartenders	No formal educational credential	15,237	\$18.07	\$48,610	21%	59%	12%	

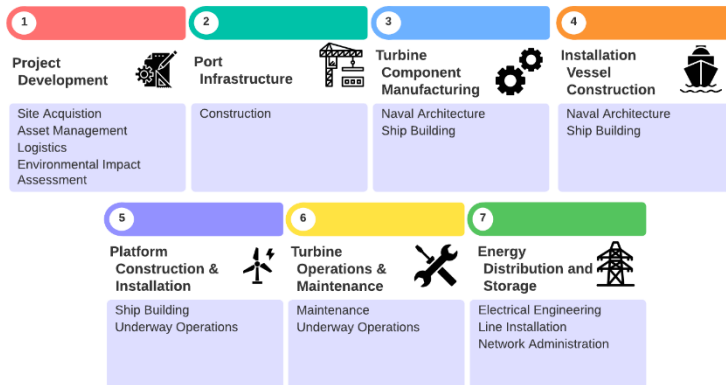
Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Butchers and Meat Cutters	No formal educational credential	2,902	\$22.81	\$46,238	41%	19%	25%
			Cooks, Fast Food	No formal educational credential	8,233	\$16.73	\$35,381	53%	33%	15%
			Cooks, Restaurant	No formal educational credential	33,340	\$19.22	\$42,682	50%	38%	15%
			Cooks, Short Order	No formal educational credential	3,269	\$18.48	\$38,813	48%	39%	16%
			Dining Room and Cafeteria Attendants and Bartender Helpers	No formal educational credential	6,886	\$16.56	\$36,254	47%	43%	18%
			Dishwashers	No formal educational credential	11,711	\$16.89	\$37,378	47%	21%	22%
			Fast Food and Counter Workers	No formal educational credential	104,326	\$16.61	\$34,965	37%	64%	13%
			Food Preparation Workers	No formal educational credential	18,199	\$17.93	\$38,418	43%	59%	19%
			Hosts and Hostesses, Restaurant,	No formal educational credential	6,733	\$16.32	\$36,774	33%	86%	11%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+	
			Lounge, and Coffee Shop								
			Waiters and Waitresses	No formal educational credential	43,311	\$17.48	\$46,405	35%	72%	9%	
		Sales	Administrative	Shipping, Receiving, and Inventory Clerks	High school diploma or equivalent	19,361	\$21.31	\$47,861	39%	32%	20%
			Other Support Professionals	Packers and Packagers, Hand	No formal educational credential	14,808	\$17.15	\$37,045	66%	63%	20%
			Sales	Cashiers	No formal educational credential	58,923	\$16.62	\$35,942	39%	73%	19%
				Counter and Rental Clerks	No formal educational credential	14,883	\$18.78	\$42,245	29%	52%	22%
				Customer Service Representatives	High school diploma or equivalent	53,420	\$21.53	\$48,318	34%	69%	18%
				Driver/Sales Workers	High school diploma or equivalent	10,155	\$18.18	\$46,155	33%	7%	27%
				Pharmacy Aides	High school diploma or equivalent	1,362	\$17.13	\$38,688	44%	80%	17%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+			
			Pharmacy Technicians	High school diploma or equivalent	7,718	\$23.44	\$49,525	36%	79%	14%			
			Sales and Related Workers, All Other	High school diploma or equivalent	5,773	\$31.89	\$62,878	24%	51%	28%			
			Sales Salespersons	No formal educational credential	85,425	\$17.18	\$39,624	31%	53%	23%			
			Stockers and Order Fillers	High school diploma or equivalent	56,843	\$18.39	\$40,560	37%	38%	19%			
			Travel Arrangements	Other Support Professionals	Travel Agents	High school diploma or equivalent	8,058	\$28.14	\$55,058	37%	65%	21%	
			Other	Administrative	Bookkeeping, Accounting, and Auditing Clerks	Some college, no degree	39,538	\$23.64	\$52,270	23%	89%	37%	
					Office Clerks, General	High school diploma or equivalent	59,253	\$21.77	\$47,902	32%	85%	29%	
					Other Support Professionals	Janitors and Cleaners	No formal educational credential	49,468	\$17.99	\$40,997	43%	33%	31%

Initiative	Phase	Type	Description	Typical Entry-Level Education	2023 Jobs	2022 Median Hourly Earnings	Avg. Annual Earnings	Current Year Total Diversity % of Occupation	Current Year Females % of Occupation	Age_55+
			Laborers and Freight, Stock, and Material Movers, Hand	No formal educational credential	56,140	\$18.76	\$42,016	40%	22%	17%
			Maintenance and Repair Workers, General	High school diploma or equivalent	36,366	\$23.68	\$53,581	30%	4%	31%
			Security Guards	High school diploma or equivalent	25,014	\$18.58	\$43,742	44%	23%	24%

Appendix C: Detailed OWS Phases



Project Development

Land Acquisition, Asset Management, and Logistics

The first step of an offshore wind farm project is to assess the feasibility of building and installing a farm in selected areas. This phase relies on project managers, energy development policymakers, public utility managers, and community outreach workers to discuss leasing and implementation terms. Community outreach workers are essential for the state and projects to fulfill the commitment to engage and work with sovereign tribal nations and other frontline communities.

Scientists

Depending on platform type (e.g., spar, semi-submersible, jacket), the Project Development phase also involves surveying the sea floor, marine fauna, and flora to assess the environmental impacts of new wind offshore substations. Geologists, wildlife scientists, atmospheric scientists, or environmental scientists and technicians conduct these tasks.

Manufacturing of Blades, Turbines, and Towers

Research and Development

The first phase of manufacturing the offshore wind substations involves designing and calibrating the future wind turbines, engines, blades, and towers. How much of this phase will happen in Washington State is still unclear.

Still, the long-lasting presence of Boeing in Everett has positioned Washington State at the forefront of aerospace and advanced manufacturing. Occupations commonly found at this stage include engineers (e.g., wind energy, civil, electrical) and associated engineering technologists and technicians.

General Manufacturing

Once the design of the turbine, engine, blade, and tower has been finalized, manufacturing-related trade and technical workers are then in charge of building these substation components. These include drafters, machinists, assemblers, and welders.

Installation Vessels Building

Offshore wind substations must be assembled at sea in several phases, from laying cables and installing the platform foundations (depending on platform type) to bringing and assembling the substation and turbines to their installation site at sea. Multiple specialized installation vessels bring all components from nearby ports to the implementation site, and more generalized vessels transport workers and supplies. Multiple trade occupations are needed to build these vessels, including fiberglass laminators, welders and cutters, and structural metal fabricators.

Construction and Installation of Platforms

Like the vessel building phase, constructing, assembling, and installing the wind substations at sea involve manual and trade occupations such as construction workers, equipment operators, and electricians. This phase also relies heavily on maneuvering installation vessels at sea to transport the wind blades and towers to their final installation sites.

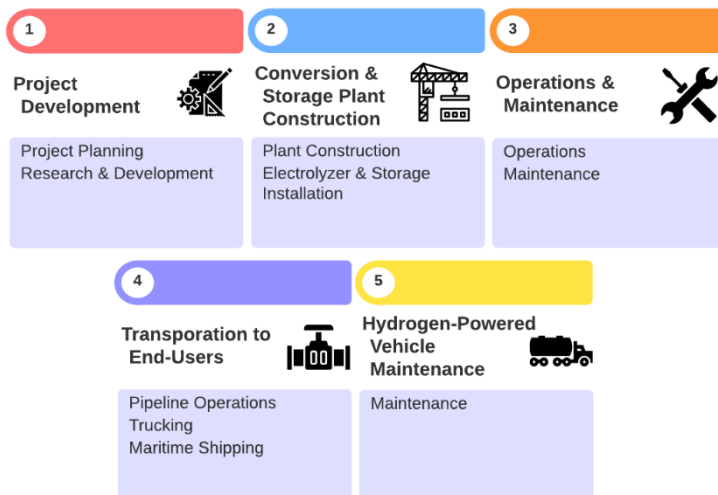
Underway crew members are required to run these vessels, including Ordinary Seamen, Able-Bodied Seamen, Oilers, Ship Engineers, Mates, and Captains. These occupations, however, have been suffering from an acute labor shortage in Washington state and nationwide for many years due in part to insufficient training capacity, stringent requirements for career advancement, and generally low awareness of employment opportunities by the general population. Successful implementation of offshore wind projects in Washington state depends on building an adequate crewing workforce to install the substations.

Operations and Maintenance

Once installed, offshore wind substations must be monitored regularly to ensure that turbines work as intended and that electricity production meets satisfactory standards. Examples of professionals responsible for these tasks include wind turbine service technicians who inspect and perform routine maintenance on wind turbines and Operations Managers who oversee farm operations.

Most occupations in the offshore wind supply chain require at least a bachelor's degree and advanced niche expertise, particularly in the initial surveying phase, as well as the research and development of turbines and other substation components. Inversely, the manufacturing, shipbuilding, and platform installation phases require skillsets typically acquired through on-the-job training or a short-term college degree.

Appendix D: Detailed Green Hydrogen Phases



Project Development

Policy Project Planning

Building a green hydrogen conversion plant is a long-term process involving negotiating with local policymakers and nearby communities to identify a building site and the source of green electricity if different from the hydrogen producer. This phase should also entail early market research to identify potential buyers for the green hydrogen that is being

produced. Occupations include public affairs specialists, community outreach specialists, and more scientific professions such as resource economics planners, power marketers, and power transmission engineers.

Research & Development

Developing and improving hydrogen electrolyzers, storage facilities, fuel cells, and batteries is a continuing process that involves many years of research and development using Research Engineers, Fuel Cell Engineers, Chemical Engineers, and Electrical Engineers, among others.

Conversion and Storage Plants Construction and Operations

Plant Construction

Once a location has been chosen, the construction of the hydrogen fuel or peaker plant relies on trades and construction occupations. First, the plant and other adjacent facilities will be built thanks to trades and construction workers, including cement masons, operating engineers and equipment operators, plumbers, and electricians.

Electrolyzers and Storage Materials Installation and Maintenance

Once the facility is finished, pipe fitters, welders, and electricians will help install electrolyzers and storage materials. At the same time, the Mechanics of hydrogen fuel cells and batteries will be responsible for maintaining this material.

Plant Operations and Maintenance

Power plant operators, plant managers, instrumentation and electronics technicians, or electrical and electronic engineering technologists and technicians will operate the new hydrogen power plant and maintain its equipment.

Transportation to End-Users

Specialized Road Transportation

When hydrogen fuel is produced, it can either be stored or distributed to end-users in specialized trucks (cryogenic liquid tanker trucks or gaseous tube trailers). Heavy and tractor-trailer truck drivers in charge of these trucks must complete safety training to handle hydrogen safely and correctly in its liquid or gaseous form. Hydrogen can also be transported for longer distances by maritime routes, but ship crews must also complete safety training.

Pipe Transportation

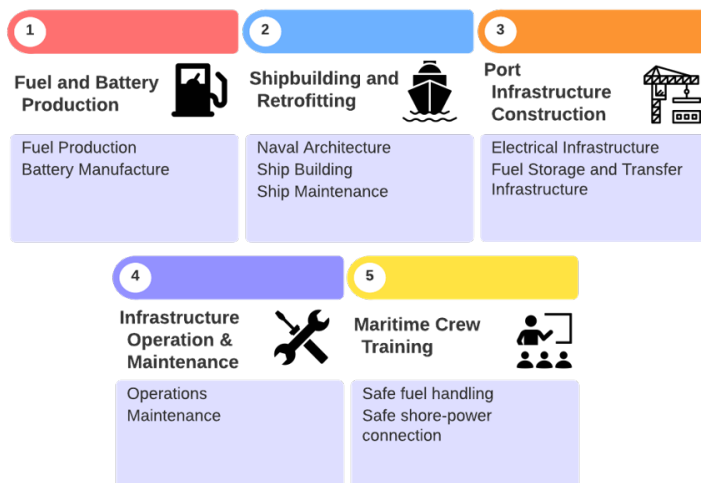
Hydrogen is most commonly transported by pipelines, the construction and maintenance of which is done by pipe and steamfitters, but also heavy construction equipment operators, welders, and other construction occupations.

End-Users

Transportation Mechanics and Technicians

In the future, hydrogen-powered cars, planes, and ships will require monitoring and repairs. Though hydrogen fuel and fuel cell-powered vehicles require less overall maintenance than internal combustion vehicles, mechanics and maritime crews must be trained to properly repair the cars and vessel propulsion systems and how to handle fuel cells and hydrogen fuel.

Appendix E: Detailed Maritime Decarbonization Phases



Fuel and Battery Production

Fuel Production

The primary clean maritime fuels are hydrogen, ammonia, methanol, marine gas oil, and liquified natural gas. Maritime decarbonization is still in the research and market assessment phase. Many maritime companies are still assessing which fuels would be the most cost-effective for their specific business needs and type of operations (e.g., passenger cruises, commercial goods shipping). Due to

this, and because each of these fuels relies on very different production methods and raw materials, it is too early to know the following critical supply chain factors:

- Which fuel(s) will be preferred by maritime companies operating in Washington state?
- Where will these fuels be produced, and how will they be transported to the port?

Given that most of the occupations involved in producing these fuels and building potential pipelines would be the same as [hydrogen production](#), this analysis focuses on the steps occurring after production and transportation along the supply chain. As a reminder, most of the occupations found at this stage would involve:

- Construction and trades workers in charge of building manufacturing facilities and pipelines (e.g., laborers, operating engineers, and other equipment operators, plumbers, pipefitters, and steamfitters),
- Plant operators in charge of running the production facilities (e.g., gas plant operators, control and valve installers and repairers, industrial machinery mechanics, chemical equipment operators),
- Other professionals in charge of ensuring product quality (e.g., chemical engineers, electrical engineers, industrial production managers).

Battery Production

Electric batteries are viable alternatives to clean fuels for vessels operating on shorter routes. The production of these batteries is still nascent in Washington state, as the first manufacturing facility opened in Bellingham in 2022. Additionally, the number of workers participating in general battery manufacturing statewide is minimal (58 jobs in 2023). Thus, the electric battery production industry is not expected to have substantial workforce impacts. However, these batteries must still be installed and maintained during ship construction or retrofitting.

Another zero-emission battery option would be nuclear maritime batteries. While these are still under development, they are seen as a promising option to power future clean vessels. Washington State is well positioned to play a pivotal role in developing atomic batteries using molten salt reactor technology due to the successful start of a pumped salt operations facility in Everett.⁹⁻¹¹ However, the effective use of these batteries in the maritime sector is still uncertain.

Training Ship Engineers and Captains, Mates, and Pilots on these new batteries and operational systems would require training. Finally, switching to atomic batteries could have unintended negative consequences should these nuclear assets be left vulnerable to cyber-attacks. Cybersecurity experts can help establish and maintain secure infrastructure to protect nuclear batteries.

Shipbuilding and Retrofitting

Occupations in shipbuilding and retrofitting are diverse due to the extended set of skills needed. As detailed in the offshore wind section above, welders and solderers are, for example, responsible for welding all the future ship's metal structures together. Fiberglass laminators and fabricators produce and install hull parts, while naval architects and designers design the ship and are responsible for launching calculations.

Port Infrastructure

To accommodate visiting electric ships, ports must have the adequate electric equipment and infrastructure necessary to recharge these ships fully. To do this, ports must work with public utilities but also need electricians, electrical engineers, or power engineers to install and maintain charging stations. Specifically, high-voltage electricians must handle specific high-voltage distribution systems and charging stations.

Maritime Crew Training

Finally, these new clean fuels the industry considers present serious safety challenges as hydrogen is known for its flammability and explosion risks, while ammonia is highly toxic.¹² It is essential that maritime crews receive safety training to properly handle these clean fuels or electric batteries and prevent accidents and workplace injuries. Engine room staff, mates, and captains must also be able to maintain and understand the electric batteries. So, while workforce needs are not expected to increase due to the decarbonization movement, underway crews, and shoreside workers will still need to upskill and undergo training.

Appendix F: Responsible Tourism NAICS Codes



Sector	NAICS Code	Industry
Accommodation and Food Services	Accommodations	
	721110	Hotels (except Casino Hotels) and Motels
	721120	Casino Hotels
	721191	Bed-and-Breakfast Inns
	721199	All Other Traveler Accommodation
	721211	RV (Recreational Vehicle) Parks and Campgrounds
	721214	Recreational and Vacation Camps (except Campgrounds)
	Food Services and Drinking Places	
	722511	Full-Service Restaurants
	722513	Limited-Service Restaurants
722514	Cafeterias, Grill Buffets, and Buffets	
722515	Snack and Nonalcoholic Beverage Bars	
Administrative and Support	Administrative and Support Services	
	561510	Travel Agencies
	561520	Tour Operators
	561591	Convention and Visitors Bureaus
	561599	All Other Travel Arrangement and Reservation Services
Performing Arts, Spectator Sports, and Related Industries		

Arts, Entertainment, and Recreation	711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities
	711320	Promoters of Performing Arts, Sports, and Similar Events without Facilities
Manufacturing	Beverage Manufacturing	
	312120	Breweries
	312130	Wineries
	312140	Distilleries
Real Estate and Rental and Leasing	Rental and Leasing Services	
	532111	Passenger Car Rental
	532112	Passenger Car Leasing
	532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing
Retail Trade	Food and Beverage Retailers	
	445110	Supermarkets and Other Grocery (except Convenience) Stores
	445120	Convenience Stores
	445210	Meat Markets
	445220	Fish and Seafood Markets
	445230	Fruit and Vegetable Markets
	445291	Baked Goods Stores
	445292	Confectionery and Nut Stores
	445299	All Other Specialty Food Stores
	445310	Beer, Wine, and Liquor Stores
	Health and Personal Care Stores	
	446110	Pharmacies and Drug Stores
	446120	Cosmetics, Beauty Supplies, and Perfume Stores
	Clothing and Clothing Accessories Stores	
	448110	Men's Clothing Stores
	448120	Women's Clothing Stores
	448130	Children's and Infants' Clothing Stores
	448140	Family Clothing Stores
	448150	Clothing Accessories Stores
	448190	Other Clothing Stores
	448210	Shoe Stores
	448310	Jewelry Stores
	Sporting Goods, Hobby, Musical Instrument, and Book Stores	
	451120	Hobby, Toy, and Game Stores
	451211	Book Stores
	451212	News Dealers and Newsstands
	General Merchandise Stores	
	452210	Department Stores
	Miscellaneous Store Retailers	
	453220	Gift, Novelty, and Souvenir Stores

	453998	All Other Miscellaneous Store Retailers (except Tobacco Stores)
	Nonstore Retailers	
	454210	Vending Machine Operators
Transportation	Deep Sea, Coastal, and Great Lakes Water Transportation	
	483112	Deep Sea Passenger Transportation
	483114	Coastal and Great Lakes Passenger Transportation
	483212	Inland Water Passenger Transportation
	Transit and Ground Passenger Transportation	
	485111	Mixed Mode Transit Systems
	485112	Commuter Rail Systems
	485113	Bus and Other Motor Vehicle Transit Systems
	485210	Interurban and Rural Bus Transportation
	485310	Taxi Service
	485320	Limousine Service
	485510	Charter Bus Industry
	485991	Special Needs Transportation
	485999	All Other Transit and Ground Passenger Transportation
	Scenic and Sightseeing Transportation	
	487110	Scenic and Sightseeing Transportation, Land
	487210	Scenic and Sightseeing Transportation, Water
	487990	Scenic and Sightseeing Transportation, Other
	Support Activities for Transportation	
	488310	Port and Harbor Operations
	488390	Other Support Activities for Water Transportation
	488410	Motor Vehicle Towing
	488490	Other Support Activities for Road Transportation

Appendix G: A Project at the Intersection of Initiatives: The Green Cruise Corridor

In response to the signing of the Clydebank Declaration in 2021 by 24 countries that committed to establishing at least six green corridors by 2025, a partnership of “early movers,” including the Port of Seattle, was formed in May 2022 to explore the feasibility of a green corridor for cruises between Washington, British Columbia, and Alaska. A green corridor is a maritime route where zero-emission technologies and solutions are demonstrated with the possibility of proving demand and viability for clean fuels and other strategies and encouraging increased investment and production.¹³ The

limited volume of the cruise route to Alaska will allow for the development and testing of fuels and infrastructure that will hopefully gain wider acceptance and use. This aligns with the Port of Seattle's goal to engage in activities that can incentivize industry in the production, use, and standardization of clean maritime fuels.^{13,14} One person knowledgeable about the project mentioned:

In addition to the Port of Seattle, the partnership includes the City and Borough of Juneau, Vancouver Fraser Port Authority, cruise lines Carnival Corporation, Norwegian Cruise Line Holdings, Royal Caribbean Group, and Cruise Lines International Association. There are also three knowledge partners: Global Maritime Forum, Blue Sky Maritime Coalition, and Washington Maritime Blue. This will be the first cruise-specific green corridor in the world.¹⁴

This project sits at the intersection of the Port's initiatives and goals. It would be part of the effort to decarbonize the maritime industry by demonstrating and incentivizing progress in maritime fuel selection and production and developing other decarbonizing technologies and infrastructure, such as shore power.

Currently, zero-emission or zero-carbon fuels are not being used at scale. Fuel suppliers are not producing the fuels; because they are not producing them, cruise companies and shipping companies are not building the ships to use them. And so it's this reinforcing cycle...so the ideal of a green corridor is to help break through that and establish these corridors that can help demonstrate zero emission fuels and technologies on a specific route, and then use that as a way to help show that those fuels are viable and help build the market to bring them elsewhere and accelerate decarbonization of shipping across the world.¹⁴

Secondly, these fuels are linked to the advancement of hydrogen technology to produce these clean fuels at scale. This could also have a reciprocal effect of driving further demand for hydrogen. Increased demand for hydrogen could further incentivize Washington's deployment of offshore wind energy as clean energy needs increase.

Thirdly, decarbonizing a popular cruise line also aligns with responsible tourism principles of reducing the environmental impact of tourist activities and providing benefits to surrounding communities by reducing cruise emissions and improving air quality near the Port.

Furthermore, depending on the final form of shore power infrastructure, these efforts could also contribute to stable excess power to local grids in Seattle and smaller port communities in Alaska. However, the massive demand required by cruise ships must be appropriately managed to provide benefits. These positive changes in the cruise industry in Seattle could drive growth as some tourists seek more responsible and climate-friendly options.

References

1. Panel unveils 10 guiding principles in campaign to revive the Earth. World Economic Forum. Published October 26, 2021. Accessed November 10, 2023. <https://www.weforum.org/agenda/2021/10/un-10-guiding-principles-campaign-revive-earth/>
2. Biden Administration Launches \$1 Billion Conservation Program. Yale E360. Accessed November 10, 2023. <https://e360.yale.edu/digest/biden-administration-launches-1-billion-conservation-program>
3. Washington State Department of Commerce. CETA: A Brief Overview. Published online 2020. <https://www.commerce.wa.gov/wp-content/uploads/2020/02/CETA-Overview.pdf>
4. Climate Commitment Act - Washington State Department of Ecology. Accessed January 17, 2024. <https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act>
5. Clean Fuel Standard - Washington State Department of Ecology. Accessed September 24, 2023. <https://ecology.wa.gov/Air-Climate/Reducing-Greenhouse-Gas-Emissions/Clean-Fuel-Standard>
6. The HEAL Act - Washington State Department of Ecology. Accessed January 17, 2024. <https://ecology.wa.gov/About-us/Who-we-are/Environmental-Justice/HEAL>
7. Clean Buildings. Washington State Department of Commerce. Accessed May 19, 2021. <https://www.commerce.wa.gov/growing-the-economy/energy/buildings/>
8. Net Ecological Gain Standard Proviso Summary Report.

9. Hall D. Molten Salt Reactor Technology Takes a Leap Forward with Successful Pumped-Salt Operations. *Energy Portal*. Published online October 6, 2023. Accessed October 6, 2023. <https://energyportal.eu/news/major-breakthrough-in-molten-salt-reactor-tech-for-maritime-use/333995/>
10. Ovcina Mandra J. Major breakthrough in molten salt reactor tech for maritime use. *Offshore Energy*. Published online October 6, 2023. Accessed October 6, 2023. <https://www.offshore-energy.biz/major-breakthrough-in-molten-salt-reactor-tech-for-maritime-use/>
11. Blenkey N. “Atomic batteries” for maritime come one step nearer. *Marine Log*. Published online October 6, 2023. Accessed October 6, 2023. <https://www.marinelog.com/news/atomic-batteries-for-maritime-come-one-step-nearer/>
12. DNV Group. Insights Into Seafarer Training and Skills Needed to Support a Decarbonized Shipping Industry. Published online 2022.
13. Exploring the World’s First Green Corridor for Cruise. Accessed October 2, 2023. <https://www.portseattle.org/projects/exploring-green-corridor-cruise-pacific-northwest-alaska>
14. *Green Corridor Webinar | Exploring the Feasibility of a Green Corridor from the PNW to Alaska.*; 2023. Accessed September 26, 2023. <https://www.youtube.com/watch?v=0XXFLaA13eE>