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Economic viability of small sail freighters in the U.S. coastal trade

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ABSTRACT

There is reasonable doubt in the maritime sector about the economic viability of small sail freighters in coastal trade. With relatively large crews and small capacities, this is of course a bad arrangement for conventional long range maritime trade. However, in comparison to trucks along a congested road corridor in a coastal trading role, these small sail freighters are found to be viable on many routes. This study examines the viability question for eight routes in comparison to trucking in the Northeast U.S.

Breakeven Load Factors and Required Freight Rates are calculated for all vessel and route pairings. On selected routes, vessels as small as 15 Gross Register Tons are economically viable if they can be kept at full capacity and major expenses such as insurance controlled. Analysis of the model's limitations is included, with financial statements appended.

Keywords: Wind Propulsion; Short Sea Shipping; Sustainable Transportation; Economic Decoupling; Economic Degrowth.

INTRODUCTION

At the 2023 Sustainability In Ship Design and Operation (hereafter SISDO) Conference at Webb Institute and the US Merchant Marine Academy, the author presented a paper on the need for a set of open-source sail freighters ranging in size from 15 to 100 Gross Register Tons.¹ While there was some enthusiasm for the vessels, and the idea that owner-operators could take on the world of maritime freight transportation without dozens of investors and

¹ Woods, Steven. “A Service-Pattern Sail Freighter: The Need For A Scalable Open-Source Sail Freighter Design.” *Proceedings of the Sustainability In Ship Design and Operation Conference 2023*. Glen Cove: Webb Institute, 2024. <https://www.researchgate.net/publication/375184586>

tens of millions of dollars in capital behind them, there was well-founded doubt as to these vessels’ economic viability.

The vessels considered here certainly go against current wisdom in the maritime industry: they are small and cannot take on long distance trade. Conventional economic studies look at minimum distances for wind propulsion to be viable, and deal with vessels three or more orders of magnitude larger than those examined in this paper.² Skepticism is natural when looking at a comparison to other ships, but this is not the mode of transport against which small coastal sail freighters will compete; they will be in competition against trucks and trains, but mostly trucks in the U.S. This means there are higher levels of revenue available, especially where roadways are congested and there are large amounts of cargo moving. In the Northeast U.S., there is a considerable stretch from Boston, MA to Richmond, VA along the coast, with many of the urban centers accessible from the water. This environment is ideal for adopting a revived coastal trade, especially as the Northeast Region begins to look at climate adaptation seriously.

Small vessels can be economically viable primarily on short routes, where frequent service would allow the transport of significant amounts of cargo through the course of a year. Small vessels, being those of 100 Gross Register Tons (GRT) or less for the purpose of this paper, are not well suited to containerized trade, but can easily handle pallets, super-sacks, and breakbulk cargo with a minimum of infrastructural support in the way of cranes and shore gear. Four specific vessel sizes are covered here, including 15, 25, 50, and 100 GRT, to reflect the major licensing categories for Captains in the U.S.³ As with the Schooner *Apollonia*, these vessels can employ existing leisure boating infrastructure for cargo movement,⁴ call at ports inaccessible to larger craft,⁵ and in smaller sizes be built in improvised or temporary shipyards by those who intend to operate them. By combining these ideas with evidence gathered in working with Schooner *Apollonia* in 2021-2023,⁶ the economic grounds for these vessels can be established.

This paper seeks to show several possible routes in the Northeast U.S. which would be economically viable for small vessels, as outlined in the plan also presented at SISDO 2023. The plan, which includes New England, New York (Great Lakes exclusive), and New Jersey,

² Perez, S; Guan, C; Mesaros, A; Talay, A, “Economic Viability of bulk cargo merchant sailing vessels” *Journal of Merchant Ship Wind Energy*, 17 August 2021.

https://www.jmwe.org/uploads/1/0/6/4/106473271/jmwe_17_august_2021.pdf

³ Woods. “A Service-Pattern Sail Freighter: The Need For A Scalable Open-Source Sail Freighter Design.” *Proceedings of the Sustainability In Ship Design and Operation Conference 2023*. Glen Cove: Webb Institute, 2024. <https://www.researchgate.net/publication/375184586>

⁴ Woods, Steven, and Sam Merrett. “Operation of a sail freighter on the Hudson River: Schooner *Apollonia* in 2021” *Journal of Merchant Ship Wind Energy*, 2 March 2022. www.researchgate.net/publication/358971392

⁵ Koltz, Bruce George. “The reintroduction of sail for marine commerce: and the consequent effects upon small port economy and trade routing” Master’s Thesis, University of Notre Dame, 1980. <https://calhoun.nps.edu/handle/10945/19039>

⁶ Woods, Steven, and Sam Merrett. “Operation of a sail freighter on the Hudson River: Schooner *Apollonia* in 2021” *Journal of Merchant Ship Wind Energy*, 2 March 2022. www.researchgate.net/publication/358971392

describes a rapid expansion of coastal and inland trade in the region using small vessels. The plan examines exclusively scheduled packet services under sail where possible, and using electric propulsion in the New York State Canal System. The plan’s primary objective is to substantially decarbonize and decongest the Interstate 95 corridor and inland routes by replacing trucks with zero-carbon maritime traffic.⁷ The methods shown in this paper can be applied to other routes outside the Northeast U.S.

ECONOMIC MODEL ASSUMPTIONS

The crew is paid \$200 per day per sailor for all sailing days of the year, provisioning costs are estimated at \$25/sailor/day, and port fees \$3 per foot per day, a relatively high average for most marinas in the Northeast (Discussed in [Appendix 1](#)). Engine use strategies are universally set to “Emergency and Docking,” using diesel engines: Schooner *Apollonia* uses her engine less than 4% of hours underway, for a draw of approximately 0.28 gallons of diesel per day for a 27 GRT vessel with 125 horsepower.⁸ Construction cost estimates were based on a review of recent similar vessel costs and are shown in Table 1, below. Please see [Appendix 3](#) for more details.

Interest on bank financing is not included, assuming that all capital is raised through the sale of stock in a corporation. Yearly insurance and maintenance costs are set at 10% of vessel construction cost, an estimate consistent with the recent experience of small cargo operators.⁹

Revenue estimates are kept deliberately low by excluding secondary forms of revenue such as passengers, trainees, co-branded products, or any other combination of revenue streams, reliance being placed entirely on fares for cargo. The number of voyages was likewise kept to a lower end of the reasonable possible range to minimize revenue predictions.

⁷ Woods, Steven. “Coastal And Inland Shipping In The Northeast US: A Plan For Expanding The Fleet And Zero Carbon Shipping.” *Proceedings of the Sustainability In Ship Design and Operation Conference 2023*. Glen Cove: Webb Institute, 2024. www.researchgate.net/publication/375184736

⁸ Woods, Steven, and Sam Merrett. “Operation of a sail freighter on the Hudson River: Schooner *Apollonia* in 2021” *Journal of Merchant Ship Wind Energy*, 2 March 2022. www.researchgate.net/publication/358971392

⁹ The Vermont Sail Freight Project’s boat *Ceres* (which paid approximately \$3,200 per year on a boat which cost approximately \$20,000 to build using a large amount of volunteer labor, which if paid at market rates would have doubled the vessel’s construction cost. SEE: Andrus, Erik. “Vermont Sail Freight Project.” Accessed 9 October, 2020. <https://vermontsailfreightproject.wordpress.com/>.

TABLE 1: VESSEL ASSUMPTIONS

Assumption	15 GRT	25 GRT	50 GRT	100 GRT	Notes
Fuel per day	4 gal	4 gal	4 gal	4 gal	At \$5/gallon
Crew strength	2	4	6	6	
Hold Capacity, ft ³	480	960	2,240	4,480	64 ft ³ per pallet
Cargo Deadweight Tonnage	7.5	15	35	70	Short tons
Construction Cost (\$)	500,000	750,000	1,000,000	2,000,000	
Length Over Spars (ft)	45	60	72	95	For docking fees

Values from Woods. “A Service-Pattern Sail Freighter: The Need for a Scalable Open-Source Sail Freighter Design.” *Proceedings of the Sustainability in Ship Design and Operation Conference 2023*. Glen Cove: Webb Institute, 2024.

Canal vessels are always booked at only 2 crew due to the limited operating hours of the New York State Canal system locks, meaning only one watch will be required at any time, with full rest periods possible for all hands overnight while waiting for the lock to open each morning. These vessels also have a limited season of 180 days assigned to them due to icing and canal closures. Due to the seasonal nature of these vessels, winter storage is included in expenses at \$50 per foot. Hybrid or electric propulsion is assumed for these vessels with a diesel backup generator, keeping fuel expenses and carbon emissions as low as possible.

This model does not account for last mile logistics such as warehousing and final delivery from the docks. For most local shippers and receivers, it is likely they will deliver their goods to the docks for the transit leg, assuming the destination is within 10 miles of the dock. The reverse is the assumption for the distant end of the transaction. As most deliveries will likely be only a few pallets, they are not likely to require significant warehousing. Trucking quotes similarly do not include warehousing, though they do include final delivery. In many cases the docks on both sides will serve as the main points of aggregation and distribution for these smaller shipments. Using the Required Freight Rates calculated below, the margin of cost for last mile delivery can be ascertained for each route.

PACKET ROUTE PARTICULARS

Eight packet routes, part of the published Northeast Sail Freight Expansion Plan through 2030,¹⁰ are described in Table 2 below. All sailing is assumed at 100 nautical miles per day on average; routes assumed are only between two ports for simplicity, but a longer route with more stops is also a reasonable business model. Sailing distances were taken from

¹⁰ Woods, Steven. “Coastal And Inland Shipping In The Northeast US: A Plan For Expanding The Fleet And Zero Carbon Shipping.” *Proceedings of the Sustainability In Ship Design and Operation Conference 2023*. Glen Cove: Webb Institute, 2024. www.researchgate.net/publication/375184736

official publications for each route involved.¹¹ Each voyage is a one-way trip, with a second voyage returning the vessel to the port of origin.

TABLE 2: ROUTE INFORMATION

Route	Sailing Miles	Days Sailing	Voyages/yr	Truck Miles
Portland-Boston	100	1	320	107
Boston-New York	400	4	85	216
New York-Cape May	128	2	180	158
New Haven-Port Jefferson	23	1	350	117
Newport-Martha’s Vineyard	45	1	350	45
Newport-Block Island	26	1	350	40 ¹²
Buffalo-Albany (via Erie Canal)	363	5	36	288
Burlington-New York (Via Champlain Canal)	267	5	36	298

There are limitations on some of these routes. For example, the island of Martha’s Vineyard currently has a monopoly for transportation of freight to the island in the form of the Steamboat Authority, which provides licenses to other operators.¹³ These expenses are not included here, and will add some cost to the routes in these cases. As mentioned above, for seasonal routes a winter storage fee is included, and the number of voyages possible is reduced significantly. For routes with extremely frequent voyages, the cost of two permanent slips is used as opposed to normal port fees, as this is significantly more cost effective than paying commercial wharf expenses twice daily. This increases profit margins significantly, but at higher levels of earnings is not necessary to meeting a ten-year payback period.

CARGO DESCRIPTION AND TRUCKING PRICES

The types of cargo which these sail freighters would carry include all non-hazardous cargoes, as either breakbulk or palletized cargo. As can be seen with Schooner *Apollonia*’s operations, most anything can be carried: “solar panels, a printing press, coffee, beer, tea, mead wine,

¹¹ United States Department of Commerce. *Distances between United States Ports*. 13th ed. Washington DC: US Department of Commerce, 2019. [nauticalcharts.noaa.gov/publications/docs/distances.pdf](https://www.nauticalcharts.noaa.gov/publications/docs/distances.pdf)

¹² Routing information for the vehicle ferry to Block Island required driving some distance from Newport to Point Judith, RI, as opposed to taking a direct path. Distance given by Google Maps is used here to maintain uniformity with other routes.

¹³ Johnson, C., Novelly, A., Starbuck, K., Wiggin, J., Uiterwyk. *Report No. 22-026: Exploring Short-Sea Shipping as an Alternative to Non-Bulk Freight Trucking in Southeastern MA* Boston: MassDOT, 2021. Pp 3. <https://www.mass.gov/doc/exploring-short-sea-shipping-as-an-alternative-to-non-bulk-freight-trucking-in-southeastern-ma-final-report/download>

salt, ...peppers... hot sauce, maple syrup, yarn, honey, jam, condiments, rope, CBD, pepper flakes, soap, skincare products, and other goods”, including whiskey, wine, chocolate, pumpkins, lumber, and malt for breweries.¹⁴ Essentially anything can be carried, but the target market in this model is pallets and breakbulk cargo, which would otherwise be moved by truck between the ports of call.

The cargo for this exercise is assumed to be non-hazardous pallets of one short ton, requiring 64 ft³ each. Longshore fees of \$20/pallet are included for each end of the voyage’s loading and unloading using ship’s gear and ship’s crew, and on-dock handling by a local longshore crew before pickup by a last-mile provider. The last-mile provider may be either the receiving party, a warehousing firm, or a local transport company using cargo bike and trailer system, among other options. It is assumed the cargo owner or freight forwarder will provide for these services, though they may also be provided for very local deliveries by the vessel’s crew, in the manner of Schooner *Apollonia*. The vessel capacity and expenses are then used to calculate a Breakeven Load Factor (BLF) for each vessel and route pairing.

For a comparison of freight rates in the region, estimates were gathered from www.Freightquote.com for the example pallet by less-than truck load on each route.¹⁵ Less-than Truck Load (LTL) shipping involves a larger truck picking up multiple small loads, as opposed to a truck being fully loaded for one destination. Generic zip-codes close to the docks were used for pickup and drop-off locations for every route, with business locations selected and no other special services needed. Lowest price was always taken, and the pickup was scheduled for 4 days out from the date of the quote. The prices per pallet by truck on the routes chosen were rounded to the nearest dollar and are given below with the approximate cost per ton-mile for each route:

Portland-Boston:	\$ 222	(\$2.07 /ton-mile)
Boston-New York:	\$ 521	(\$2.41 /ton-mile)
New York-Cape May:	\$ 285	(\$1.80 /ton-mile)
New Haven-Port Jefferson:	\$ 280	(\$2.39 /ton-mile)
Newport-Martha’s Vineyard:	\$ 738	(\$16.40 /ton-mile)
Newport-Block Island:	\$ 130	(\$3.25 /ton-mile)
Buffalo-Albany:	\$ 192	(\$0.66 /ton-mile)
Burlington-New York:	\$ 470	(\$1.58 /ton-mile)

RESULTS

The indicator of economic viability used for each route was the Breakeven Load Factor (BLF)¹⁶. The BLF is the percentage of full-cargo space which must be filled in order to pay

¹⁴ Woods, Steven, and Sam Merrett. “Operation of a sail freighter on the Hudson River: Schooner *Apollonia* in 2021” *Journal of Merchant Ship Wind Energy*, 2 March 2022. www.researchgate.net/publication/358971392 Pp 4-5

¹⁵ www.freightquote.com accessed 16 December 2023.

¹⁶ “Breakeven Load Factor (BLF) is the average percent of seats that must be filled on an average flight at current average fares for the airline’s passenger revenue to break even with the airline’s

the vessel’s yearly operational expenses, with a vessel pay-off period of ten years. Since trucking rates in most cases were reasonably high, most routes are viable within ten years at competitive prices at a relatively low use of the hold space, though predictably the larger vessels need a lower percentage of their space filled to achieve this economic goal.

Table 3, below, shows the breakeven load factors for each route and vessel pairing. The BLF varies from as low as 12% to as high as 91% depending on the route and vessel combination. The Newport-Martha’s Vineyard run unsurprisingly had the smallest BLF due to the high price of trucking, with Burlington-New York having the highest figure across all vessels. Some route and vessel pairs do not break even within ten years even at 100% capacity, while the only completely non-viable route is the Erie Canal run from Buffalo to Albany. The reader is referred to the Appendix for more detailed information on route costs.

On Table 3, all non-competitive routes (those requiring more than 100% of the vessel’s capacity to break even) are struck through. There is a clear trend toward larger vessels requiring a lower percentage of their capacity in order to break even. Of course, reaching that lower percentage would require more cargo for larger vessels, underscoring the need to carefully consider the cargo demand when selecting a vessel.

TABLE 3: BREAKEVEN LOAD FACTOR BY FREIGHTER CAPACITY AND ROUTE

ROUTE	15 GRT	25 GRT	50 GRT	100 GRT
Portland-Boston	83%	73%	51%	41%
Boston-New York	F&D	91%	59%	43%
New York-Cape May	F&D	90%	60%	46%
Port Jefferson-New Haven	58%	52%	38%	31%
Newport-Martha’s Vineyard	22%	20%	15%	12%
Newport-Block Island	F&D	F&D	81%	65%
Buffalo-Albany via Erie Canal	F&D	F&D	F&D	F&D
Burlington-New York via Champlain Canal	F&D	F&D	81%	71%

Notes: Non-viable routes are struck through. F&D represents “Full and Down” condition.¹⁷

operating expenses.” Jason Goodfriend “Rising Breakeven Load Factors Threaten Airline Finances” *BTS Issue Brief* 8, Oct 2003.
https://www.bts.dot.gov/sites/bts.dot.gov/files/legacy/publications/special_reports_and_issue_briefs/issue_briefs/number_08/pdf/entire.pdf

¹⁷ This term may be antiquated, but is especially useful when working with breakbulk cargo, where one might be Full (all cubic space filled), but not Down (loaded to maximum weight capacity), or vice-versa. “**Full and Down**: having all cargo space filled and being so weighted as to have the hull down exactly to the Plimsoll mark.” *Merriam-Webster.com Dictionary*, s.v. “full and down,” accessed February 13, 2024, <https://www.merriam-webster.com/dictionary/full%20and%20down>

A Required Freight Rate (RFR) also provides insight into economic viability. As can be seen in the financial statements in the Appendix, expenses are generally fixed or predictable for each packet line over the course of a year. Maximum capacity is also predictable, computed as cargo tonnage multiplied by total voyages. For example, assuming a ten-year payoff period, the annual expenses of a 15 GRT freighter on the New York-Boston packet run would be roughly \$350,000 and an annual capacity of 637.5 tons, giving a Required Freight Rate of \$549.02 per ton. This is competitive with the figure for that same route given above, but the 100 GRT schooner on the same route is significantly better, with an RFR of \$157.08 per ton, only 30% of the quoted trucking rate.

When calculations are made for the RFR and compared to the competitive trucking price given above, the results are not significantly different than those given by calculating BLF above. Two more routes do become competitive, defined as within 10% of the quoted trucking rate, but certain routes remain economically non-viable. These are either the seasonal routes in canals, which have to make all their money in a very short period of time, working along very well trafficked interstate highway corridors, or supplying Block Island. As Block Island only has about 1,500 permanent residents, it is unlikely to be able to support a larger freighter through the entire year. Table 3 gives the calculated RFR for each vessel and route pairing, with non-competitive routes struck through.

TABLE 4: REQUIRED FREIGHT RATES BY FREIGHTER CAPACITY AND ROUTE

ROUTE	15 GRT	25 GRT	50 GRT	100 GRT
Portland-Boston	186.64	161.90	112.97	91.00
Boston-New York	549.02	477.33	305.40	157.08
New York-Cape May	294.95	258.33	172.25	130.95
Port Jefferson-New Haven	163.24	146.48	104.81	84.84
Newport-Martha's Vineyard	163.24	146.48	104.81	84.84
Newport-Block Island	163.24	146.48	104.81	84.84
Buffalo-Albany via Erie Canal	1,027.72	692.56	385.98	338.55
Burlington-New York via Champlain Canal	1,027.72	692.56	385.98	338.55

Notes: Non-Competitive routes are struck through. Competitive Rate is any within 10% of rate quoted above. RFRs calculated using a 10 year payoff for vessel construction.

Aside from economic viability, the effects on carbon emissions are an important aspect of this exercise. Table 5 shows the number of metric tons of emissions saved by implementing the routes considered here, assuming trucking emissions of 107.5 g co₂/tkm (tonne

kilometer) (.0006 tonnes CO2 per ton mile).¹⁸ The results for each vessel and route pairing are given in Table 5.

TABLE 5: ANNUAL EMISSIONS IMPACT BY ROUTE IN METRIC TONS CO2

ROUTE	15 GRT	25 GRT	50 GRT	100 GRT
Portland-Boston	141.3	295.4	706.2	1,425.3
Boston-New York	69	151.6	372	757.5
New York-Cape May	113.6	241.6	582.8	1,180.1
Port Jefferson-New Haven	170.3	354.6	846	1705.9
Newport-Martha’s Vineyard	56.9	127.8	316.8	647.5
Newport-Block Island	49	112	280	574
Buffalo-Albany via Erie Canal	39.5	86.1	210.5	428.3
Burlington-New York via Champlain Canal	41.1	89.4	218.1	443.4
One Vessel Working Each Route:	680.7	1,458.5	3,478.4	7,162

This table gives the maximum carbon emissions each sail freighter can save by mode shifting cargo away from trucking.

Incorporating the Social Cost of Carbon into the equation generates significant further incentives for adopting these vessels. The Social Cost of Carbon is a financial measure of the harm caused by emitting one ton of CO2 equivalent greenhouse gas emissions. Currently this cost is rated at \$2,200 in New York, based off of US EPA recommendations. Please consult [Appendix 2](#) for more details.

Increasing costs in the model do not prohibit profitability on all routes. The 100 GRT vessel full and down on the Boston-New York run with a construction cost of \$7,000,000, crew pay at \$250/day, and insurance and maintenance costs remaining set at 10% of construction cost still came up with a payback time of 10 years. The 50 GRT example remained within the 10-year viability period under the same increased burdens up to a construction cost of 2.8 million dollars. Of course, these higher expenses increase the minimum hold capacity use requirement for viability, but do not completely preclude an economical employment of the vessel.

FEEDER ROUTES AND VESSELS

The use of 15 GRT vessels for feeder routes into ports of consolidation has been considered as part of theoretical sail freight networks. Especially where trucks must drive a long distance

¹⁸ Energy Information Administration. “Carbon Dioxide Emissions Coefficients.” https://www.eia.gov/environment/emissions/co2_vol_mass.php (Accessed 8 February 2022)

around a body of water, such as Cape Cod Bay or Long Island Sound, there may be an opportunity to create a feeder route in a small vessel which provides a cargo-ferry type service cutting across this long trucking arc. From these outer locations, cargo to or from more distant ports is gathered to a major hub such as Boston, Newport, or New York. Examples of where this would apply include Massachusetts Bay, Narragansett Bay, Raritan Bay, and Lake Champlain.

To illustrate a few of these types of routes, Massachusetts Bay is used as a model, and four routes are explored using the previous assumptions. Port fees are kept at a daily fee as opposed to marina slips, due to the high expense of marina slips in this area. The routes are as follows:

TABLE 6: FEEDER ROUTE INFORMATION

Route	Sailing Miles	Days Sailing	Voyages/yr	Truck Miles	\$/Pallet
Boston-Gloucester	26	1	350	35	184
Boston-Plymouth	40	1	350	40	184
Boston-Provincetown	49	1	350	116	427
Boston-Portsmouth	61	1	350	64	232

Feeder Route Information: Feeder routes as covered in this model,

The Gloucester and Plymouth packets had a BLF of 95%, Portsmouth 75%, and Provincetown was viable at a mere 41% with the 15 GRT vessel. As Provincetown’s seasonal population can rise to 60,000 people and the town has a natural harbor, a service from Boston to Provincetown under sail seems like a promising business prospect. 60,000 people will require approximately 150 metric tonnes of food per day using Woods’ calculation method,¹⁹ the vast majority imported from elsewhere. The waters between the two ports remain relatively protected through the entire route, and costs could still be paid if the leg back to Boston was in ballast routinely. This is not surprising, as the route’s geometry is extremely similar to the New Haven-Port Jefferson run, but with a significantly higher price per pallet. The RFR for a 15 GRT schooner on the Provincetown run was calculated at only \$176.58, or about 41% of trucking rates, and competitive on all four of the feeder routes above. Reducing the number of voyages to 180 and adding winter storage resulted in an RFR of \$249.94, still highly competitive, and taking advantage of the peak tourist and sailing season to make the project more appealing to the crew. Even this reduced half-year project stands to make up to \$78,050 in the first two years if charging the same as trucking. With the crew on \$72,000

¹⁹ Woods, Steven. “Sail Freight Revival: Methods of calculating fleet, labor, and cargo needs for supplying cities by sail.” Master’s Thesis. Prescott College, 2021. www.researchgate.net/publication/354841970 Pp 19-21. This assumes a 2.5kg level of supply; A more reasonable estimate would be about 360 tons per day, allowing for a 6kg level of supply, reduced from the model on pp 71-73 to account for tourist nature of most of this population.

annual salaries to ensure retention, up to \$150,000 could be made in three years under this model. A three-year payback gives an RFR of \$303.28 in this case.

For the Provincetown route, an additional vessel was considered: an inexpensive 36-foot fiberglass sloop salvaged and converted to carry 3 tons. This vessel, making the same route as described above with two crew, a purchase cost of \$10,000,²⁰ insurance set to 50%, and the remainder of the model unmodified, indicates an ability to pay off all capital expenses and pocket \$7,900 within two years at 56% capacity. After the purchase is paid off, annual operations could be undertaken at a BLF of merely 55%. The RFR calculation for the first year, including purchase of the boat is \$249.45 per ton, 58.4% of the listed trucking price. If run on a seasonal model as described above, the RFR for this vessel would be only \$371.30 per ton in the first year, a highly competitive rate; subsequent years the RFR would decline to \$352.78.

Full and down, this repurposed fiberglass yacht could make roughly \$205,000 per year in net profit. While maintenance costs may be higher than an annual expenditure of \$1,000, there is clearly plenty of room for error in this budget, and three years' operations could theoretically pay for a 15 GRT vessel in cash. The use of this type of salvaged sail freighter as an initial scout vessel can establish the possibility of packet routes while requiring low initial capital investment. This type of vessel may also be successful on routes such as Newport-Martha's Vineyard, and similar single-day routes with reliable cargo and high trucking charges.

There are other options for similar very small vessels which will not require much design effort, nor a large investment for construction. A George Buehler designed 37-foot cutter “Jenny” in his book on backyard boatbuilding²¹ could carry approximately 5 tons in a heavy loaded condition, if modified for cargo operations, with about 360 cubic feet of hold space. This allows for 5 pallet loads as described in this model, with a boat construction cost of less than \$100,000 assuming plywood-on-frame construction. This would allow for an RFR of \$176.17 using the standard model, and \$298.22 for seasonal operations, both highly competitive prices for the Boston-Provincetown route. This requires only 20% of the investment assumed for a 15 GRT vessel, though the service life of such a plywood boat may be shorter than a similar vessel built in steel. The lower initial investment makes good sense in cases where a purpose-built boat will give some advantages for either marketing or utility, but can put the initial capital requirements within reach of a wider variety of interested groups.

DISCUSSION

It appears from the results of this analysis that if costs are kept under control and cargo is available, sail freighters under 100 GRT may be economically viable on a multitude of routes

²⁰ It is assumed the sailboat is used, and purchased from either an auction or as an abandoned boat in a marina. Increasing the cost to \$50,000 still yields a BLF of 63% and RFR of \$272.30 at full capacity.

²¹ Buehler, George. *Buehler's Backyard Boatbuilding For The 21st Century*. Camden: International Marine, 2014. “Jenny” plans are on pages 303-312.

in the U.S. Northeast. While not all possible routes are examined here, the same methods can be applied to other routes to determine economic viability.

There are some inherent practical and economic advantages to using small vessels in coastal trade, as opposed to larger ships. These include the opening of a wider variety of small ports closer to cargo destinations,²² increased resilience of the supply chain in instances of disaster or mishap, the ability to resist monopolization, and a short dwell time on docks. On some routes of less than 50 miles, one or more smaller vessels making more runs may be desirable due to space constraints at the docks on one side or other of the route, allowing the same volume of deliveries to be spread over a wider time window. The use of multiple smaller ships on a longer route will allow for daily sailings from each port, such as using eight 100 GRT vessels on the New York-Boston route: at any given time, one is handling cargo at each end, and six others are passing each other on the seas en-route. Cargo can be delivered to the dock any day of the week and will still be delivered four to five days later at the docks in New York, simplifying the job of freight forwarders and cargo owners. Using a single vessel of 560 tons capacity could move the same amount of cargo annually, but with considerably less convenience. This may remove some objections to using sustainable short sea shipping options on these shorter routes, as it will be no more or less convenient than trucking.

In strictly numerical terms, these vessels are crew inefficient, with between 3.75-11.67 Tons Per Sailor (TPS), lower than the average for Sloops and Schooners in 1906.²³ However, for vessels under 100 GRT, these are reasonable numbers, especially for the 100 GRT vessel. This is an important technical metric as labor is one of the largest expenses for any sail freight operation, taking up as much as 30-40% of the operating budget. Automation, such as electric winches and roller furling sails can reduce manpower requirements and increase crew efficiency of these vessels to some degree. On very short voyages of less than 8 hours duration, crews can be significantly smaller, though this will prevent 24-hour operations. In this case, for the larger vessels the Tons Per Sailor figure may be increased and expenses reduced in proportion.

In looking at longer routes, only larger vessels will be economically viable, though this will of course depend on the freight rates. Since a longer route can be traversed fewer times per year, more money must be made per ton on each voyage. The 100-ton freighter seems to reach its limits on most routes at or about a 7-day voyage, such as Boston-Baltimore, but a 200 GRT vessel carrying 200 tons of cargo may be viable for the fortnight of sailing needed to reach Puerto Rico from New York, or routes in a similar voyage class such as Tampa-New York.

The RFR calculations made here are applicable in the Northeast, but may be of interest elsewhere. For example, the Newport-Block Island RFR would apply just as well to vessels crossing between New London, CT and Orient Point, NY on the Eastern tip of Long Island, where freight rates are far higher. The same could be said for any cross-harbor or Cross

²² Koltz, “The reintroduction of sail for marine commerce”

²³ Woods, “Sail Freight Revival” Pp 59-61.

Sound operation not only in New York and the Long Island Sound, but for Cape Cod Bay, Narraganset Bay, Lake Champlain, Cross-Chesapeake Bay routes, and others. Where maritime traffic can only be avoided with difficulty, such as in Hawaii, the Florida Keys, the Salish Sea, and Alaska Islands, these rates may also be important observations.

Other forms of ownership and operation are not included here, such as Community Supported Shipping wherein a group of cargo owners each pay a share of the vessel's costs for the year in exchange for as much shipping as the vessel can take on. These models are quite different than a regular revenue-based model, and may be better suited to small operations than to a prediction of economic viability. Another ownership case now long restricted to the past is the Master-Owner for a coastal vessel. This was ruled out by the 1920s by both landside transportation competition from railroads and trucking, and the increasing size and capital expense of vessels. With the possibility of a \$500,000 freighter capable of making a profit, there is a far better chance to have an owner-master model, and the possibility of some runs being viable using modified recreational boats or plans for home building, such as those by George Buehler, the Master-Owner model becomes more possible on certain routes.²⁴

Home-build type boats as explored on the Boston-Provincetown run above have the capability of running an RFR highly competitive to trucking on all of the feeder routes covered in this paper. Further, they give favorable rates for other short distance routes, such as New Haven-Port Jefferson, Newport-Martha's Vineyard, Newport-Block Island, and potentially many others. These types of craft may be a good entry point for most Sail Freight projects, especially if cost of construction can be kept below the assumed \$100,000 mark. It would be possible for these vessels to fill the smaller niche that both scow sloops and schooners filled along the US coasts in the 19th century²⁵ and the Galway Hookers filled in Western Ireland from the mid 17-20th centuries.²⁶ Especially in regions such as the Gulf of Maine, Cape Cod Bay, Narragansett Bay, and similar areas, this type of “Community Boat” model could take a reasonable amount of cargo and trucks off the roads.

Changing the capacity of sail freighters, especially in the smaller sizes, will make them far more viable. The Vermont Sail Freight Project's *Ceres* carried 10 tons at 14.5 GRT;²⁷ Tad Robert's 28 GRT cargo schooner design is rated to carry 18 short tons, while the 17.7 GRT version can carry 15 short tons.²⁸ By increasing the capacity of these two smallest proposed open-source vessels, they become viable on more routes, particularly for the 15 GRT vessel on the Boston-New York (88%) and New York-Cape May (88%) routes, even with crew costs

²⁴ Buehler. *Buehler's Backyard Boatbuilding For The 21st Century*.

²⁵ Martin, J. C. “Scows, and barges, or other vessels of box model’: Comparative capital investment in the sailing scows of the Great Lakes of North America and in New Zealand.” *Int'l Journal of Maritime Hist*, 30(1), 2018. 89–105. doi.org/10.1177/0843871417746290

²⁶ Ó Sabhain, Pádraig Seosamh. “The centrality of the Galway hooker to dwelling in the island and coastal communities of south west Conamara.” PHD Thesis. NUI Galway, 2019. <https://aran.library.nuigalway.ie/handle/10379/15935>

²⁷ Andrus, "Vermont Sail Freight Project."

²⁸ Tad Roberts Yacht Design. “60 Ft Cargo Schooner” www.tadroberts.ca/services/new-design/sail/steelcargoschooner60

kept at \$250 per day. As the vessels have yet to be designed, the particulars of cargo capacity have not been firmly determined and fixed, but the values given in this paper reflect the minimum requirements from the work this is based on.

Sail training, cobranding, passengers, carbon credits, and sponsors are all options for other streams of revenue available to sail freighters which have not been incorporated into this model. For most sail freight operations, sail training is an integral and essential part of their model, and enables the cargo mission by filling gaps in funding.²⁹ While the number of trainees a small vessel can accommodate may be very limited, the value of having a few berths available may make longer distances or less profitable routes (such as the Erie Canal) economically viable. Passenger service on a leisure basis may also be a revenue stream of interest to windjammer captains on shorter routes, but can add to requirements for regulatory compliance.

A network of regional sail freight vessels on coastal routes has the potential to encourage CO₂-GDP Decoupling in the transport sector, wherein the greenhouse gas emissions per unit of GDP are reduced instead of increased. This elusive goal is currently not happening fast enough to avoid dangerous levels of climate change in the next 30 years,³⁰ but with profitable sustainable transport operations in action, there will be a commercial necessity to compete, driving change in absence of government action. Despite a lack of meaningful action, most of the State Governments in the Northeast have committed to some sort of emissions reduction plan, which should welcome a commercial opportunity to move toward their goals while not expending government resources. This is an element of the re-introduction of Sail Freight which should be considered, especially with small vessels operating within a single state's waters, such as the Newport-Block Island and Boston-Provincetown runs.

The reactions and sentiments of marina operators must be incorporated into current discourses on sail freight using small vessels and existing infrastructure. Where municipal docks do not exist or cannot accommodate cargo operations, existing marinas normally can. While this requires breakbulk handling of cargo (unless a vessel can tie up to a solid wharf or bulkhead with sufficient working space to stage or sort goods), this may not be a significant disadvantage for small vessels in the 15-25 GRT range. Moving pallets on narrow docks oriented towards leisure applications is difficult and presents a number of concerns, including the dock's buoyancy, which can be alleviated by carrying off small loads at a time. For the 50-100 GRT vessels, this becomes a problem due to the time involved in off-loading and loading a full cargo in this manner. Marina operators may not object to hand trucks and bike trailers being used on their docks, but extensive use of cranes and pallet jacks may be over the threshold of acceptance. While the marinas are capable of providing the initial infrastructure needed, it remains to be seen if they are willing to do so. Perceived risk of

²⁹ De Beukelaer, Christiaan, *Trade Winds: A Voyage To Zero-Emissions Shipping* Manchester: Manchester University Press, 2023.

³⁰ Vogel, Jefim et al. “Is green growth happening? An empirical analysis of achieved versus Paris-compliant CO₂-GDP decoupling in high-income countries.” *The Lancet Planetary Health*, 7:9, e759 - e769 [https://doi.org/10.1016/S2542-5196\(23\)00174-2](https://doi.org/10.1016/S2542-5196(23)00174-2)

injury, damage to customer’s vessels, noise disturbance, and other nuisances to leisure boaters are likely to discourage marinas from engaging with sail freight operations. However, Schooner *Apollonia* has had remarkable success in finding marinas who are willing to allow small scale cargo operations on their docks, and municipal docks can be convinced through local activism and economic benefits. This topic requires more study and a comprehensive evaluation alongside a survey of existing infrastructure.

The last piece to be discussed, but possibly the most important, is the issue of attracting cargo. All of the models incorporated in this paper assume there is cargo available. The extremely price-elastic demand for transportation means the service will need to depend on being cost competitive to attract cargo. By undercutting other services, the slight delay which might be entailed by using sail freight may possibly be overlooked. In most cases, having the ear of an established freight forwarder looking to reduce costs will be critical to obtaining the volume of cargo needed to make these services economically viable. While piecemeal gathering of interested cargo owners may work for the smaller vessels with limited capacity to fill, the larger vessels will undoubtedly require a formal pipeline of cargo to keep the hold sufficiently full.

CONCLUSIONS

It appears small sail freighters can be competitive with trucking on coastal routes, if run on tight margins and with patient capital investors who are willing to wait several years for a significant return. On selected routes, a small vessel could be paid off and investors seeing a net return within two to three years if an intensive schedule is run, there is sufficient cargo available, and any necessary permits do not increase costs excessively.

It is important to note that transportation is, to most people, simply transportation: they don’t especially care how something travels, so long as it gets there on time and in good shape. It is especially beneficial if that also happens at the lowest possible price. There will be no economic force aside from price competition to shift cargo to these more ecologically sound methods until the externalities of our current transport system are internalized through appropriate taxes. With this state of affairs and a lack of government action, the coastal sail freighter will have to compete on price alone, not marketing, and in that competition it must consistently undercut the costs of trucking on any commercially viable route. These routes must also integrate neatly with the existing trade routes and traffic patterns of trucking if they are to have a significant impact on carbon emissions and roadway congestion.

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APPENDIX 1: PORT FEES

Port fees may well be kept below the totals given here through long term contracts or other means. Many marinas have seasonal slip rates significantly lower than their transient docking rate, and municipal dock space could similarly be contracted at a long-term rate lower than the local transient rate, estimated at about \$100 per foot in this model. In some cases, Schooner *Apollonia* has been able to arrange free docking at some locations which are especially interested in supporting the revival of coastal trade under sail.³¹ If a cargo owner has a dock on their property with reasonable road access, they may be convinced to provide free or low-cost docking in return for a lower shipping rate on their own goods. While these methods are generally feasible and should be pursued by a sail freight operation, the rule of \$3 per foot per day of docking is maintained as representative of costs in general in the Northeast US, with far higher costs expected in major ports such as New York City and Boston.

APPENDIX 2: COST OF CARBON AND POLLUTION

In New York State the undiscounted social cost of carbon is listed at \$2,200 per metric ton based on EPA guidance,³² therefore the value of even the least effective of the modal shifts demonstrated in this paper is worth some \$86,900 annually. The most effective vessel and route combination, a 100 GRT vessel on the Port Jefferson-New Haven run, would give a social benefit of some 3.75 million dollars per year on a vessel which cost only two million to build. This route is especially important for these purposes because it displaces a relatively large number of trucks which have to pass through some of the nation's most congested roadways, and proved economically viable during the last Oil Crisis.³³ All but two routes for the 100 GRT vessel pay for half the vessel's construction cost per year by this metric, and the same is found with the 50 GRT schooner. The two smaller vessels each require longer periods of operation to pay their construction costs through avoided carbon, but the payback period is not long in any case.

Part of the conversation about these results should be costs avoided on land. While the cost of congestion in lost fuel and time on overcrowded highways is discussed elsewhere in more detail,³⁴ there are some economic costs which should be incorporated into the model here as an infrastructural savings. These include savings on roadway maintenance and the public

³¹ Conversations with Brad Vogel, January-February 2024.

³² NYS DEC *Establishing A Value Of Carbon: Guidelines For Use By State Agencies*. Albany: NYS Dept of Environmental Conservation, 2023.

[Extapps.Dec.Ny.Gov/Docs/Administration_pdf/Vocguide23final.Pdf](https://www.dec.ny.gov/docs/administration_pdf/Vocguide23final.Pdf)

³³ Setinberg, Carol. “A Phoenix raises a stir” *New York Times* 18 Mar 1984.

www.nytimes.com/1984/03/18/nyregion/a-phoeix-raises-a-stir.html

³⁴ See: Woods and Merrett, “Operation of a Sail Freighter On The Hudson River”; Jinwon Kim “Estimating the social cost of congestion using the bottleneck model” *Economics of Transportation* 19, September 2019, 100119 <https://doi.org/10.1016/j.ecotra.2019.100119>

health effects of reduced truck traffic.³⁵ Economic effects of jobs in supporting trades are also excluded in this economic analysis.

APPENDIX 3: VESSEL CONSTRUCTION COSTS

Construction Costs for vessels are estimates in this paper, based on literature review. Woods’ thesis price of the Electric Clipper 64 was projected at about \$1,000,000 for a 50 GRT vessel.³⁶ The same applied to the EC110 which is about 130 GRT (simplified measure) was costed at about 1.9 million dollars, with the “Secret Trader 40” of 15 GRT being priced between \$350,000-500,000.³⁷ The RSS-80, a 100 GRT inland and coastal vessel designed by Trans-Tech Marine in 2015, was estimated at approximately \$800,000 in 2022, though this may be inexpensive compared to other vessels of similar size due to the simplified junk rig employed.³⁸

A Schooner design from Tad Roberts at three sizes, 15 GRT, 17.7 GRT, and 28.6 GRT, have a hull construction estimate ranging from approximately \$101,175 to \$185,275, before outfitting, shipyard overhead, rig, or other expenses. The estimating information was provided as pounds of steel and man-hours of welding for each design. The schooners required between 16,500-30,000 pounds of steel and 3,000-5,500 hours of welding for the hull.³⁹ Steel was estimated at \$0.85 per pound as given by Tad Roberts. Labor cost estimated using \$29.05/hour, from the average of Construction and Extraction occupations in shipyards.⁴⁰

While no estimates are given in Buehler’s book for the materials and labor for any of his designs, the rough estimates for many of them range around \$75,000-150,000. Using the estimating instructions in *Backyard Boatbuilding for the 21st Century*,⁴¹ costs of a plywood 37 foot cutter should run at or about \$100,000 using \$30 per hour for labor costs and 1600 hours of labor. This design should be capable of carrying about 5 tons, with sufficient freeboard remaining for safe sailing in most conditions. A \$100,000 build would not include non-navigational systems, such as water tanks or showers, but would be sailable.

³⁵ Austin, David. *Pricing Freight Transport to Account for External Costs*. Washington: Congressional Budget Office, 2015. www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/50049-Freight_Transport_Working_Paper-2.pdf.

³⁶ Woods, Steven. “Sail Freight Revival: Methods of calculating fleet, labor, and cargo needs for supplying cities by sail.” Master’s Thesis. Prescott College, 2021. www.researchgate.net/publication/354841970

³⁷ Email Correspondence with Derek Ellard, 23 Nov 2020; 20 Apr 2021; 10 Jun 2021.

³⁸ Geoff Uttmark to Andrew Willner, “Eriemax (AKA River-Sea-Ship 80 or RSR-80) Demonstration Project.” 5 July 2022. Via The Center For Post Carbon Logistics.

³⁹ Email Correspondence with Tad Roberts, 29 August 2022.

⁴⁰ Bureau of Labor Statistics “Ship and Boat Building” *Occupational Outlook Handbook* www.bls.gov/oes/current/naics4_336600.htm (Accessed 13 February 2024)

⁴¹ Buehler, George. *Buehler's Backyard Boatbuilding For The 21st Century*. Camden: International Marine, 2014. “Jenny” plans are on pages 303-312, estimating guidelines are given on pages 15-16.

Sail Freight Project Financials
ROUTE: Boston-New York
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 85 Voyages Full & Down

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	137,700	\$2.41	332,137.50
Gross Revenue			<u>332,137.50</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	680	\$200.00	136,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	680	\$25.00	17,000.00
Longshore Labor Fees, per pallet	1,275	\$20.00	25,500.00
Port Fees, \$3/ft/day	110	\$135.00	14,850.00
Total Expenses			<u>800,150.00</u>
Net Income			<u>(468,012.50)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	137,700	\$2.41	332,137.50
Gross Revenue			<u>332,137.50</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	680	\$200.00	136,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	680	\$25.00	17,000.00
Longshore Labor Fees, per pallet	1,275	\$20.00	25,500.00
Port Fees, \$3/ft/day	110	\$135.00	14,850.00
Total Expenses			<u>300,150.00</u>
Net Income			<u>31,987.50</u>
Total Profits First Two Years			<u>(436,025.00)</u>

Sail Freight Project Financials
ROUTE: Boston-New York
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 85 Voyages 91%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	250,614	\$2.41	604,490.25
Gross Revenue			<u>604,490.25</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,360	\$200.00	272,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, Per Gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,360	\$25.00	34,000.00
Longshore Labor Fees, per pallet	2,550	\$20.00	51,000.00
Port Fees, \$3/ft/day	110	\$180.00	19,800.00
Total Expenses			<u>1,283,600.00</u>
Net Income			<u>(679,109.75)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	250,614	\$2.41	604,490.25
Gross Revenue			<u>604,490.25</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,360	\$200.00	272,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, per gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,360	\$25.00	34,000.00
Longshore Labor Fees, per pallet	2,550	\$20.00	51,000.00
Port Fees, \$3/ft/day	110	\$180.00	19,800.00
Total Expenses			<u>533,600.00</u>
Net Income			<u>70,890.25</u>
Total Profits First Two Years			<u>(608,219.50)</u>

Sail Freight Project Financials
ROUTE: Boston-New York
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 85 Voyages 59%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	379,134	\$2.41	914,485.25
Gross Revenue			<u>914,485.25</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, Per Gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	5,950	\$20.00	119,000.00
Port Fees, \$3/ft/day	110	\$216.00	23,760.00
Total Expenses			<u>1,808,560.00</u>
Net Income			<u>(894,074.75)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	379,134	\$2.41	914,485.25
Gross Revenue			<u>914,485.25</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, per gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	5,950	\$20.00	119,000.00
Port Fees, \$3/ft/day	110	\$216.00	23,760.00
Total Expenses			<u>808,560.00</u>
Net Income			<u>105,925.25</u>
Total Profits First Two Years			<u>(788,149.50)</u>

Sail Freight Project Financials
ROUTE: Boston-New York
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 85 Voyages 43%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	552,636	\$2.41	1,332,978.50
Gross Revenue			<u>1,332,978.50</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	11,900	\$20.00	238,000.00
Port Fees, \$3/ft/day	110	\$285.00	31,350.00
Total Expenses			<u>3,135,150.00</u>
Net Income			<u>(1,802,171.50)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	552,636	\$2.41	1,332,978.50
Gross Revenue			<u>1,332,978.50</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	11,900	\$20.00	238,000.00
Port Fees, \$3/ft/day	110	\$285.00	31,350.00
Total Expenses			<u>1,135,150.00</u>
Net Income			<u>197,828.50</u>
Total Profits First Two Years			<u>(1,604,343.00)</u>

Sail Freight Project Financials
ROUTE: Boston-New York
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 85 Voyages Full and Down

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	1,285,200	\$2.41	3,099,950.00
Gross Revenue			<u>3,099,950.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	11,900	\$20.00	238,000.00
Port Fees, \$3/ft/day	110	\$285.00	31,350.00
Total Expenses			<u>3,135,150.00</u>
Net Income			<u><u>(35,200.00)</u></u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	1,285,200	\$2.41	3,099,950.00
Gross Revenue			<u>3,099,950.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,040	\$200.00	408,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	1,360	\$5.00	6,800.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,040	\$25.00	51,000.00
Longshore Labor Fees, per pallet	11,900	\$20.00	238,000.00
Port Fees, \$3/ft/day	110	\$285.00	31,350.00
Total Expenses			<u>1,135,150.00</u>
Net Income			<u><u>1,964,800.00</u></u>
Total Profits First Two Years			<u><u>1,929,600.00</u></u>

Sail Freight Project Financials
ROUTE: Buffalo-Albany
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 36 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	77,760	\$0.67	51,840.00
Gross Revenue			<u>51,840.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	540	\$20.00	10,800.00
Port Fees, \$3/ft/day	221	\$135.00	29,835.00
Total Expenses			<u>727,485.00</u>
Net Income			<u>(675,645.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	77,760	\$0.67	51,840.00
Gross Revenue			<u>51,840.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	540	\$20.00	10,800.00
Port Fees, \$3/ft/day	221	\$135.00	29,835.00
Total Expenses			<u>227,485.00</u>
Net Income			<u>(175,645.00)</u>
Total Profits First Two Years			<u>(851,290.00)</u>

Sail Freight Project Financials
ROUTE: Buffalo-Albany
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 36 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	155,520	\$0.67	103,680.00
Gross Revenue			<u>103,680.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	60	\$50.00	3,000.00
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	1,080	\$20.00	21,600.00
Port Fees, \$3/ft/day	221	\$180.00	39,780.00
Total Expenses			<u>1,048,980.00</u>
Net Income			<u>(945,300.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	155,520	\$0.67	103,680.00
Gross Revenue			<u>103,680.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	60	\$50.00	3,000.00
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	1,080	\$20.00	21,600.00
Port Fees, \$3/ft/day	221	\$180.00	39,780.00
Total Expenses			<u>298,980.00</u>
Net Income			<u>(195,300.00)</u>
Total Profits First Two Years			<u>(1,140,600.00)</u>

Sail Freight Project Financials
ROUTE: Buffalo-Albany
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 36 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	362,880	\$0.67	241,920.00
Gross Revenue			<u>241,920.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	72	\$50.00	3,600.00
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	2,520	\$20.00	50,400.00
Port Fees, \$3/ft/day	221	\$216.00	47,736.00
Total Expenses			<u>1,386,336.00</u>
Net Income			<u>(1,144,416.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	362,880	\$0.67	241,920.00
Gross Revenue			<u>241,920.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	72	\$50.00	3,600.00
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	2,520	\$20.00	50,400.00
Port Fees, \$3/ft/day	221	\$216.00	47,736.00
Total Expenses			<u>386,336.00</u>
Net Income			<u>(144,416.00)</u>
Total Profits First Two Years			<u>(1,288,832.00)</u>

Sail Freight Project Financials
ROUTE: Buffalo-Albany
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 36 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	725,760	\$0.67	483,840.00
Gross Revenue			<u>483,840.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	95	\$50.00	4,750.00
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	5,040	\$20.00	100,800.00
Port Fees, \$3/ft/day	221	\$285.00	62,985.00
Total Expenses			<u>2,653,135.00</u>
Net Income			<u>(2,169,295.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	725,760	\$0.67	483,840.00
Gross Revenue			<u>483,840.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	95	\$50.00	4,750.00
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	5,040	\$20.00	100,800.00
Port Fees, \$3/ft/day	221	\$285.00	62,985.00
Total Expenses			<u>653,135.00</u>
Net Income			<u>(169,295.00)</u>
Total Profits First Two Years			<u>(2,338,590.00)</u>

Sail Freight Project Financials
ROUTE: Burlington-New York
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 36 Voyages Full & Down

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	80,460	\$1.58	126,900.00
Gross Revenue			<u>126,900.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	540	\$20.00	10,800.00
Port Fees, \$3/ft/day	221	\$135.00	29,835.00
Total Expenses			<u>727,485.00</u>
Net Income			<u>(600,585.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	80,460	\$1.58	126,900.00
Gross Revenue			<u>126,900.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	540	\$20.00	10,800.00
Port Fees, \$3/ft/day	221	\$135.00	29,835.00
Total Expenses			<u>227,485.00</u>
Net Income			<u>(100,585.00)</u>
Total Profits First Two Years			<u>(701,170.00)</u>

Sail Freight Project Financials
ROUTE: Burlington-New York
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 36 Voyages Full & Down

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	160,920	\$1.58	253,800.00
Gross Revenue			<u>253,800.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	60	\$50.00	3,000.00
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	1,080	\$20.00	21,600.00
Port Fees, \$3/ft/day	221	\$180.00	39,780.00
Total Expenses			<u>1,048,980.00</u>
Net Income			<u>(795,180.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	160,920	\$1.58	253,800.00
Gross Revenue			<u>253,800.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	60	\$50.00	3,000.00
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	1,080	\$20.00	21,600.00
Port Fees, \$3/ft/day	221	\$180.00	39,780.00
Total Expenses			<u>298,980.00</u>
Net Income			<u>(45,180.00)</u>
Total Profits First Two Years			<u>(840,360.00)</u>

Sail Freight Project Financials
ROUTE: Burlington-New York
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 36 Voyages 81%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	304,139	\$1.58	479,682.00
Gross Revenue			<u>479,682.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	72	\$50.00	3,600.00
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	2,520	\$20.00	50,400.00
Port Fees, \$3/ft/day	221	\$216.00	47,736.00
Total Expenses			<u>1,386,336.00</u>
Net Income			<u>(906,654.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	304,139	\$1.58	479,682.00
Gross Revenue			<u>479,682.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	72	\$50.00	3,600.00
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	2,520	\$20.00	50,400.00
Port Fees, \$3/ft/day	221	\$216.00	47,736.00
Total Expenses			<u>386,336.00</u>
Net Income			<u>93,346.00</u>
Total Profits First Two Years			<u>(813,308.00)</u>

Sail Freight Project Financials
ROUTE: Burlington-New York
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 36 Voyages 71%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	533,182	\$1.58	840,924.00
Gross Revenue			<u>840,924.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	95	\$50.00	4,750.00
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	5,040	\$20.00	100,800.00
Port Fees, \$3/ft/day	221	\$285.00	62,985.00
Total Expenses			<u>2,653,135.00</u>
Net Income			<u>(1,812,211.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	533,182	\$1.58	840,924.00
Gross Revenue			<u>840,924.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	360	\$200.00	72,000.00
Winter Storage, per ft	95	\$50.00	4,750.00
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	720	\$5.00	3,600.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	360	\$25.00	9,000.00
Longshore Labor Fees, per pallet	5,040	\$20.00	100,800.00
Port Fees, \$3/ft/day	221	\$285.00	62,985.00
Total Expenses			<u>653,135.00</u>
Net Income			<u>187,789.00</u>
Total Profits First Two Years			<u>(1,624,422.00)</u>

Sail Freight Project Financials
ROUTE: New Haven-Port Jefferson
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 350 Voyages 58%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	178,133	\$2.39	426,300.00
Gross Revenue			<u>426,300.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>878,500.00</u>
Net Income			<u>(452,200.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	178,133	\$2.39	426,300.00
Gross Revenue			<u>426,300.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>378,500.00</u>
Net Income			<u>47,800.00</u>
Total Profits First Two Years			<u>(404,400.00)</u>

Sail Freight Project Financials
ROUTE: New Haven-Port Jefferson
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 350 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	307,125	\$2.39	735,000.00
Gross Revenue			<u>735,000.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>921,025.00</u>
Net Income			<u>(186,025.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	307,125	\$2.39	735,000.00
Gross Revenue			<u>735,000.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>421,025.00</u>
Net Income			<u>313,975.00</u>
Total Profits First Two Years			<u>127,950.00</u>

Sail Freight Project Financials
ROUTE: New Haven-Port Jefferson
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 350 Voyages 52%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	319,410	\$2.39	764,400.00
Gross Revenue			<u>764,400.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,444,000.00</u>
Net Income			<u>(679,600.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	319,410	\$2.39	764,400.00
Gross Revenue			<u>764,400.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>694,000.00</u>
Net Income			<u>70,400.00</u>
Total Profits First Two Years			<u>(609,200.00)</u>

Sail Freight Project Financials
ROUTE: New Haven-Port Jefferson
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 350 Voyages 38%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	544,635	\$2.39	1,303,400.00
Gross Revenue			<u>1,303,400.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>2,183,900.00</u>
Net Income			<u>(880,500.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	544,635	\$2.39	1,303,400.00
Gross Revenue			<u>1,303,400.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,183,900.00</u>
Net Income			<u>119,500.00</u>
Total Profits First Two Years			<u>(761,000.00)</u>

Sail Freight Project Financials
ROUTE: New Haven-Port Jefferson
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 350 Voyages 31%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	888,615	\$2.39	2,126,600.00
Gross Revenue			<u>2,126,600.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>3,878,500.00</u>
Net Income			<u>(1,751,900.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	888,615	\$2.39	2,126,600.00
Gross Revenue			<u>2,126,600.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,878,500.00</u>
Net Income			<u>248,100.00</u>
Total Profits First Two Years			<u>(1,503,800.00)</u>

Sail Freight Project Financials
ROUTE: New York-Cape May
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 180 Voyages Full and Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	213,300	\$1.80	384,750.00
Gross Revenue			<u>384,750.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	720	\$200.00	144,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	720	\$25.00	18,000.00
Longshore Labor Fees, per pallet	2,700	\$20.00	54,000.00
Port Fees, \$3/ft/day	185	\$135.00	24,975.00
Total Expenses			<u>848,175.00</u>
Net Income			<u>(463,425.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	213,300	\$1.80	384,750.00
Gross Revenue			<u>384,750.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	720	\$200.00	144,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	720	\$25.00	18,000.00
Longshore Labor Fees, per pallet	2,700	\$20.00	54,000.00
Port Fees, \$3/ft/day	185	\$135.00	24,975.00
Total Expenses			<u>348,175.00</u>
Net Income			<u>36,575.00</u>
Total Profits First Two Years			<u>(426,850.00)</u>

Sail Freight Project Financials
ROUTE: New York-Cape May
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 180 Voyages 90%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	383,940	\$1.80	692,550.00
Gross Revenue			<u>692,550.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,440	\$200.00	288,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, Per Gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,440	\$25.00	36,000.00
Longshore Labor Fees, per pallet	5,400	\$20.00	108,000.00
Port Fees, \$3/ft/day	185	\$180.00	33,300.00
Total Expenses			<u>1,372,500.00</u>
Net Income			<u>(679,950.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	383,940	\$1.80	692,550.00
Gross Revenue			<u>692,550.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,440	\$200.00	288,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, per gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,440	\$25.00	36,000.00
Longshore Labor Fees, per pallet	5,400	\$20.00	108,000.00
Port Fees, \$3/ft/day	185	\$180.00	33,300.00
Total Expenses			<u>622,500.00</u>
Net Income			<u>70,050.00</u>
Total Profits First Two Years			<u>(609,900.00)</u>

Sail Freight Project Financials
ROUTE: New York-Cape May
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 180 Voyages 60%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	597,240	\$1.80	1,077,300.00
Gross Revenue			<u>1,077,300.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,160	\$200.00	432,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, Per Gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,160	\$25.00	54,000.00
Longshore Labor Fees, per pallet	12,600	\$20.00	252,000.00
Port Fees, \$3/ft/day	185	\$216.00	39,960.00
Total Expenses			<u>1,985,160.00</u>
Net Income			<u>(907,860.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	597,240	\$1.80	1,077,300.00
Gross Revenue			<u>1,077,300.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,160	\$200.00	432,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, per gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,160	\$25.00	54,000.00
Longshore Labor Fees, per pallet	12,600	\$20.00	252,000.00
Port Fees, \$3/ft/day	185	\$216.00	39,960.00
Total Expenses			<u>985,160.00</u>
Net Income			<u>92,140.00</u>
Total Profits First Two Years			<u>(815,720.00)</u>

Sail Freight Project Financials
ROUTE: New York-Cape May
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 180 Voyages 46%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	915,768	\$1.80	1,651,860.00
Gross Revenue			<u>1,651,860.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,160	\$200.00	432,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,160	\$25.00	54,000.00
Longshore Labor Fees, per pallet	25,200	\$20.00	504,000.00
Port Fees, \$3/ft/day	185	\$285.00	52,725.00
Total Expenses			<u>3,449,925.00</u>
Net Income			<u>(1,798,065.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	915,768	\$1.80	1,651,860.00
Gross Revenue			<u>1,651,860.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,160	\$200.00	432,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	1,440	\$5.00	7,200.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,160	\$25.00	54,000.00
Longshore Labor Fees, per pallet	25,200	\$20.00	504,000.00
Port Fees, \$3/ft/day	185	\$285.00	52,725.00
Total Expenses			<u>1,449,925.00</u>
Net Income			<u>201,935.00</u>
Total Profits First Two Years			<u>(1,596,130.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Block Island
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 350 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	105,000	\$3.25	341,250.00
Gross Revenue			<u>341,250.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>878,500.00</u>
Net Income			<u>(537,250.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	105,000	\$3.25	341,250.00
Gross Revenue			<u>341,250.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>378,500.00</u>
Net Income			<u>(37,250.00)</u>
Total Profits First Two Years			<u>(574,500.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Block Island
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 350 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	210,000	\$3.25	682,500.00
Gross Revenue			<u>682,500.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,444,000.00</u>
Net Income			<u>(761,500.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	210,000	\$3.25	682,500.00
Gross Revenue			<u>682,500.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>694,000.00</u>
Net Income			<u>(11,500.00)</u>
Total Profits First Two Years			<u>(773,000.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Block Island
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 350 Voyages 81%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	396,900	\$3.25	1,289,925.00
Gross Revenue			<u>1,289,925.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>2,183,900.00</u>
Net Income			<u>(893,975.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	396,900	\$3.25	1,289,925.00
Gross Revenue			<u>1,289,925.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,183,900.00</u>
Net Income			<u>106,025.00</u>
Total Profits First Two Years			<u>(787,950.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Block Island
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 350 Voyages 65%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	637,000	\$3.25	2,070,250.00
Gross Revenue			<u>2,070,250.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>3,878,500.00</u>
Net Income			<u>(1,808,250.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	637,000	\$3.25	2,070,250.00
Gross Revenue			<u>2,070,250.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,878,500.00</u>
Net Income			<u>191,750.00</u>
Total Profits First Two Years			<u>(1,616,500.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Martha's Vineyard
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 350 Voyages 22%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	25,988	\$16.40	426,195.00
Gross Revenue			<u>426,195.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>878,500.00</u>
Net Income			<u>(452,305.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	25,988	\$16.40	426,195.00
Gross Revenue			<u>426,195.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$200.00	140,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>378,500.00</u>
Net Income			<u>47,695.00</u>
Total Profits First Two Years			<u>(404,610.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Martha's Vineyard
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 350 Voyages Full & Down

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	118,125	\$16.40	1,937,250.00
Gross Revenue			<u>1,937,250.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$100.00	70,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, Per Gallon	350	\$5.00	1,750.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>803,250.00</u>
Net Income			<u><u>1,134,000.00</u></u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	118,125	\$16.40	1,937,250.00
Gross Revenue			<u>1,937,250.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	700	\$100.00	70,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$200.00	9,000.00
Fuel, Diesel, per gallon	350	\$5.00	1,750.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	700	\$25.00	17,500.00
Longshore Labor Fees, per pallet	5,250	\$20.00	105,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>303,250.00</u>
Net Income			<u><u>1,634,000.00</u></u>
Total Profits First Two Years			<u><u>2,768,000.00</u></u>

Sail Freight Project Financials
ROUTE: Newport-Martha's Vineyard
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 350 Voyages 20%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	47,250	\$16.40	774,900.00
Gross Revenue			<u>774,900.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,444,000.00</u>
Net Income			<u>(669,100.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	47,250	\$16.40	774,900.00
Gross Revenue			<u>774,900.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,400	\$200.00	280,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$200.00	12,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,400	\$25.00	35,000.00
Longshore Labor Fees, per pallet	10,500	\$20.00	210,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>694,000.00</u>
Net Income			<u>80,900.00</u>
Total Profits First Two Years			<u>(588,200.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Martha's Vineyard
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 350 Voyages 15%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	82,688	\$16.40	1,356,075.00
Gross Revenue			<u>1,356,075.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>2,183,900.00</u>
Net Income			<u>(827,825.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	82,688	\$16.40	1,356,075.00
Gross Revenue			<u>1,356,075.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$200.00	14,400.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	24,500	\$20.00	490,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,183,900.00</u>
Net Income			<u>172,175.00</u>
Total Profits First Two Years			<u>(655,650.00)</u>

Sail Freight Project Financials
ROUTE: Newport-Martha's Vineyard
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 350 Voyages 12%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	132,300	\$16.40	2,169,720.00
Gross Revenue			<u>2,169,720.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, Per Gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>3,878,500.00</u>
Net Income			<u>(1,708,780.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	132,300	\$16.40	2,169,720.00
Gross Revenue			<u>2,169,720.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	2,100	\$200.00	420,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$200.00	19,000.00
Fuel, Diesel, per gallon	1,400	\$5.00	7,000.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	2,100	\$25.00	52,500.00
Longshore Labor Fees, per pallet	49,000	\$20.00	980,000.00
Port Fees, \$3/ft/day	365	\$0.00	-
Total Expenses			<u>1,878,500.00</u>
Net Income			<u>291,220.00</u>
Total Profits First Two Years			<u>(1,417,560.00)</u>

Sail Freight Project Financials
ROUTE: Portland-Boston
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 320 Voyages 83%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	213,144	\$2.07	442,224.00
Gross Revenue			<u>442,224.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	640	\$200.00	128,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	640	\$25.00	16,000.00
Longshore Labor Fees, per pallet	4,800	\$20.00	96,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>895,675.00</u>
Net Income			<u>(453,451.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	213,144	\$2.07	442,224.00
Gross Revenue			<u>442,224.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	640	\$200.00	128,000.00
Winter Storage, per ft	45	\$0.00	-
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	640	\$25.00	16,000.00
Longshore Labor Fees, per pallet	4,800	\$20.00	96,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>395,675.00</u>
Net Income			<u>46,549.00</u>
Total Profits First Two Years			<u>(406,902.00)</u>

Sail Freight Project Financials
ROUTE: Portland-Boston
OPEN SOURCE SAIL FREIGHTER 15
YEAR 1: 320 Voyages Full & Down

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	256,800	\$2.07	532,800.00
Gross Revenue			<u>532,800.00</u>
Vessel Purchase	1	\$500,000.00	500,000.00
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	640	\$200.00	128,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, Per Gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	640	\$25.00	16,000.00
Longshore Labor Fees, per pallet	4,800	\$20.00	96,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>897,925.00</u>
Net Income			<u>(365,125.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	256,800	\$2.07	532,800.00
Gross Revenue			<u>532,800.00</u>
Insurance	1	\$50,000.00	50,000.00
Crew Labor, per Sailor Day	640	\$200.00	128,000.00
Winter Storage, per ft	45	\$50.00	2,250.00
Seasonal Marina Slip, per foot	45	\$0.00	-
Fuel, Diesel, per gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$50,000.00	50,000.00
Provisioning, per person-day	640	\$25.00	16,000.00
Longshore Labor Fees, per pallet	4,800	\$20.00	96,000.00
Port Fees, \$3/ft/day	365	\$135.00	49,275.00
Total Expenses			<u>397,925.00</u>
Net Income			<u>134,875.00</u>
Total Profits First Two Years			<u>(230,250.00)</u>

Sail Freight Project Financials
ROUTE: Portland-Boston
OPEN SOURCE SAIL FREIGHTER 25
YEAR 1: 320 Voyages 73%

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	374,928	\$2.07	777,888.00
Gross Revenue			<u>777,888.00</u>
Vessel Purchase	1	\$750,000.00	750,000.00
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,280	\$200.00	256,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, Per Gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,280	\$25.00	32,000.00
Longshore Labor Fees, per pallet	9,600	\$20.00	192,000.00
Port Fees, \$3/ft/day	365	\$180.00	65,700.00
Total Expenses			<u>1,452,100.00</u>
Net Income			<u>(674,212.00)</u>

YEAR 2

Line-Item	Quantity	Per Unit	Amount
Gross Revenue, Freight	374,928	\$2.07	777,888.00
Gross Revenue			<u>777,888.00</u>
Insurance	1	\$75,000.00	75,000.00
Crew Labor, per Sailor Day	1,280	\$200.00	256,000.00
Winter Storage, per ft	60	\$0.00	-
Seasonal Marina Slip, per foot	60	\$0.00	-
Fuel, Diesel, per gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$75,000.00	75,000.00
Provisioning, per person-day	1,280	\$25.00	32,000.00
Longshore Labor Fees, per pallet	9,600	\$20.00	192,000.00
Port Fees, \$3/ft/day	365	\$180.00	65,700.00
Total Expenses			<u>702,100.00</u>
Net Income			<u>75,788.00</u>
Total Profits First Two Years			<u>(598,424.00)</u>

Sail Freight Project Financials
ROUTE: Portland-Boston
OPEN SOURCE SAIL FREIGHTER 50
YEAR 1: 320 Voyages 51%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	611,184	\$2.07	1,268,064.00
Gross Revenue			<u>1,268,064.00</u>
Vessel Purchase	1	\$1,000,000.00	1,000,000.00
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	1,920	\$200.00	384,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, Per Gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	1,920	\$25.00	48,000.00
Longshore Labor Fees, per pallet	22,400	\$20.00	448,000.00
Port Fees, \$3/ft/day	365	\$216.00	78,840.00
Total Expenses			<u>2,165,240.00</u>
Net Income			<u>(897,176.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	611,184	\$2.07	1,268,064.00
Gross Revenue			<u>1,268,064.00</u>
Insurance	1	\$100,000.00	100,000.00
Crew Labor, per Sailor Day	1,920	\$200.00	384,000.00
Winter Storage, per ft	72	\$0.00	-
Seasonal Marina Slip, per foot	72	\$0.00	-
Fuel, Diesel, per gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$100,000.00	100,000.00
Provisioning, per person-day	1,920	\$25.00	48,000.00
Longshore Labor Fees, per pallet	22,400	\$20.00	448,000.00
Port Fees, \$3/ft/day	365	\$216.00	78,840.00
Total Expenses			<u>1,165,240.00</u>
Net Income			<u>102,824.00</u>
Total Profits First Two Years			<u>(794,352.00)</u>

Sail Freight Project Financials
ROUTE: Portland-Boston
OPEN SOURCE SAIL FREIGHTER 100
YEAR 1: 320 Voyages 41%

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	982,688	\$2.07	2,038,848.00
Gross Revenue			<u>2,038,848.00</u>
Vessel Purchase	1	\$2,000,000.00	2,000,000.00
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	1,920	\$200.00	384,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, Per Gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	1,920	\$25.00	48,000.00
Longshore Labor Fees, per pallet	44,800	\$20.00	896,000.00
Port Fees, \$3/ft/day	365	\$285.00	104,025.00
Total Expenses			<u>3,838,425.00</u>
Net Income			<u>(1,799,577.00)</u>

YEAR 2

<u>Line-Item</u>	<u>Quantity</u>	<u>Per Unit</u>	<u>Amount</u>
Gross Revenue, Freight	982,688	\$2.07	2,038,848.00
Gross Revenue			<u>2,038,848.00</u>
Insurance	1	\$200,000.00	200,000.00
Crew Labor, per Sailor Day	1,920	\$200.00	384,000.00
Winter Storage, per ft	95	\$0.00	-
Seasonal Marina Slip, per foot	95	\$0.00	-
Fuel, Diesel, per gallon	1,280	\$5.00	6,400.00
Maintenance Costs	1	\$200,000.00	200,000.00
Provisioning, per person-day	1,920	\$25.00	48,000.00
Longshore Labor Fees, per pallet	44,800	\$20.00	896,000.00
Port Fees, \$3/ft/day	365	\$285.00	104,025.00
Total Expenses			<u>1,838,425.00</u>
Net Income			<u>200,423.00</u>
Total Profits First Two Years			<u>(1,599,154.00)</u>