OceanPro Industries Ltd
Carbon Fishprint Rating™

Product Name: Date: **Score:** -
Category: Profish Category Average

Fisheries account for about 1.2% of global oil consumption and directly emit more than 130 million tons of CO2 into the atmosphere. From an efficiency perspective, the energy content of the fuel burned by global fisheries is 12.5 times greater than the edible protein energy content of the resulting catch. At OceanPro Industries we want our customers to have all the information available to make good carbon Fishprint purchasing decisions. This spreadsheet is done for all our products - from time to time - to allow for a rough estimate on the Carbon Energy use required to bring a specific product to your store - this is by no means scientific, but rather a good faith estimate based on the information available to us in our purchasing decisions. The higher your total score, the more Carbon Energy required to bring the product to market.

The fishing stage itself is clearly the main contributor to environmental impacts (global warming, eutrophication, photochemical ozone creation, aquatic ecotoxicity) with an average of at least 90% over the total production cycle (extraction, processing, transport, distribution, consumption), and this is more specifically the fault of high fuel consumption and the emissions that result from this. Thus the method of catch and the distance from the shore are all factors in the calculation below.

Passive gears are by far the most energy-efficient type of fishing, while bottom trawling is the most energy-intensive. There is an inverse correlation between fuel consumption per kg fish (fish-capture efficiency) and catch rate. Large catches and good availability of fish result naturally enough in good efficiency and low specific energy consumption, and vice versa. This is shown most clearly in the case of large trawlers, but is more diffuse in the other vessel groups.

Mark an X next to each box that applies

Fishing Method		he ck	s For X	Subtotal
Seiners				Seine nets are sometimes called surrounding nets. These nets use a variety of means to capture - from hand thrown to as many as four or five boats dragging the net around the harvest in the water, Seine nets typically do not drag the bottom so their effect on habitat of aquatic plant and shellfish is less than other methods.
	Purse Seines		**8**	Purse seine vessels can be different sizes, however most product at OceanPro, which involve a purse seine net, are harvested through a medium to larger sized fishing vessel which use a circle craft to close the loop. Because of the dual boats in the process, the rating for this method is slightly higher than some other Seine methods.
	Pair Seines		10	This method uses two boats to bring a large amount catch into the net. The first boat is the anchor while the second surrounds the prey. Because of the two boats - this method requires more carbon energy to catch.
	European Seines		**10**	These are large ocean going craft which often use smaller craft to help with surrounding net. These vessels travel further distances for their catch and thus have a higher rating
	Two Boat Seine		**10**	These seiners use large nets in deep oceans. Both boats are larger vessels and at times numerous smaller craft are in the water helping to ensure the net closes properly. Because of this the two boat seines have a high rating
	Drum Seine		**6**	Predominantly used in River Harvests, these boats are typically smaller than many other seiners and thus require less energy for capture
Gill Net	Gill Net		**5**	This is a straight line net which is dropped and often left overnight. The nets are efficient because the nets do not need steaming (or boat movement) to harvets. Thus this method inspires a better Carbon Fishprint rating.
Trawlers				Trawlers are vessels which drag the net behind the boat, using fuel constantly during the harvest method. Some trawlers do drag the bottom so there is effect on aquatic plant and shellfish life.
	Bottom Trawler		**9**	Because the bottom trawler drags along the bottom and it requires more energy to drag this net, using this method can earn a higher point system on the OceanPro Fishprint.
	Midwater Otter Trawls		**8**	Otter trawlers are dual nets dragging wide of the boat with the assistance of outriggers. Because of the extra drag on the boat, there is additional carbon required to harvest with this method.
	Otter Twin Tails		**8**	Otter trawlers are dual nets dragging wide of the boat with the assistance of outriggers. Because of the extra drag on the boat, there is additional carbon required to harvest with this method.
Hook and Line				This method is used to catch larger fish - different methods are used with pole and line, some more efficient trhan others - carbon speaking that is!
	Drifting and Fixed Long Lines		**9**	Long lining is a fishing method where a long line with hooks is set in the Ocean, attached to the line at a various intervals are hooks on steel leaders. The Harvest method uses carbon energy both during the setting of the lines and during the harvest - the ship continually runs the engines during the process, thus this process uses more carbon energy than other processes.
	Trolling Lines		**8**	Trolling is a method where many lines are run behind a moving vessels, attracting fish to moving prey. The ship continues to move throughout the process thus more carbon energy is required than pole and line method, however because a trolled will generally run many lines simultaneously, and the intended harvest is larger fish, this method does have efficiencies.
	Pole and Line		**7**	Used primarily for large schools of fish, the pole there are two primary mehods- one where the boat continually moves while individual fisherman troll with pole and line and the second where the vessel continually drifts as the fisherman harvest. The second method is more efficient from a Carbon energy standpoint, but both methods produce a high yield of fish in comparison to the carbon energy as they generally use this method for schools of larger fish.
Dredgers				Dredges are cages or nets with steel bottoms which drag along the bottom of the ocean floor. Used mostly in shellfish harvesting, like Scallops and Lobsters and Clams, this method uses more energy to move the net along the bottom - the method also distrubs
	Boat Dredges		**8**	the ocean floor aquatic plant life, thus further effecting its Carbon Fishprint.
	Hand Dreges		**2**	While no power is used for hand dredges, other than to move the carrying vessel into position, the hand dredge does disturb some plant growth on the ocean floor, modestly effecting the carbon fishprint

Pots/Traps

Pots and traps generally use the same method to capture their prey. Usually keeping traps and pots in a set or series of six to eight traps, the boat travels back and forth to get from one series to the next. Deeper ocean going vessels require larger carbon energy to operate and so their rating will be effected more by the distance to harvest than by the method. While the seiner will have the larger vessel stationary, the pot/trap method requires the vessel to always be traveling towards the next series - using fuel constantlyu in the process.

Wench Based trap Lift	**6**	Because the wench requires some power, this method has a slightly higher rating
Stationary Pots/Traps	**5**	These traps are usually closer to shore so the usage is slightly less.

Distance From Shore for Catch

The distance from shore is critical both for the obvious reason - the distance, but also because the farther a vessel travels, usually the larger the motor(s) required to get the vessel in position, thus the farther the travel to harvest, the more significant the carbon use.

The more distance a boat travels from the shore, the more carbon based energy it must consume. This rating also takes into consideration the size of the catchas compared to the size of the engines or the vessel.

Less than 500	**5**	
Between 501 and 1000	**8**	While larger boats travel farther, they often have significantly larger weight when they return, thus the carbon energy used for each fish caught is less than might appear. Thus In addition to the distance, the OceanPro Fishprint Scale takes into consideration the size of the catch in relation to the distamnce from the shore.
Over 1001	**12**	
Size of Catch Addition Factor	**0**	Can be a negative number

Special Carbon Usage or Savings

Sometime for a specific fish or specific catch, there reasons for a change in the Carbon usage - this section allows for such change and reasons are detailed here:

5	

Section Total -

As far as Aquaculture is concerned, most studies indicate that embodied energy associated with feed inputs accounted for the largest proportion (approx. 60 to 80%) of industrial energy use, followed by direct energy usage (20 to 40%) and energy use in rearing the juvenile smolts stocked (10 to 20%). This might suggest that use of trimming could improve energy consumption in aquaculture by up to (50 60%) More recent estimates suggest lower overall energy consumption, indicating improved efficiency.

Aquaculture

Feed Conversion Ratio

This ratio is the quintessential compnent of a successful farm species. Some farms are better in these ratios because of the specifc processes or methods. Species also have

Less than 2 lbs to 1 #	**3**	
Greater than 2 pounds to 1 #	**5**	

Direct Energy Use

This section is a review of the specific farm and the energy conservation methods they use. Some farms have their pens far from their processing center, causing an increase to the Carbon Energy nmecessary to bring to processing. Other farms are located far from transportation to market and thus use more carbon energy to bring their products to market. We try to evaluate each farmed product based on the producer efficiency. Extra credit is guiven for self generated energy and smart use of energy.

Good Production Energy Use #	**4**	
Average Production Energy Use #	**7**	
Poor Production Energy Use #	**12**	

Specific Farm Energy Use

The growing of smolts is an intense process. It requires a number of different energy uses, including special lighting, water temperature stability and innoculations - all have a energy component associated with their use. The OceanPro Fishprint takes the smolt production into consideration as a part of the scale to determine the amount of Carbon

Smart Smolt Growth Energy Use #	**3**	
Regular Smolt Gorwth Energy Use #	**7**	

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Section Total -

Product Name:

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Another large use of Energy is the ability to bring the product to market. Depending on the locality of the source, this can be accomplished with many different methods - dependant on the condition of the source and distance to the customer. Included in the ditribution is the use of the refrigeratants and the energy to keep a product at proper temperatures, airplane or truck delivery - or any combination of such. Also included in this section is the efficiency of the distruibutor and the freight companies and their general practices.

Delivery from Dock to Distributor

This section measures the distance a fish must travel once it is landed. The fish can be either acquaculturally raised or harvested from the wild. In either case, once landed and processed for delivery, there is carbon energy necessary to bring a product to market. Some use air travel, some use rail and still others truck. Some, like aquaculture products from South America use a combination of both so their Carbon Fishprint is higher than one might have initially anticipated.

Airplane less than 1000 miles	**11**	While rare, some fish is frieghted by air for short distances - because planes use most energy taking off, this factor is diosproportionately higher.
Airplane greater than 1000 miles	**17**	Longer air requires more energy
Airplane greater than 3000 miles	**22**	Longer air travel requires still more energy use
Truck Less than 500	**3**	Truck is the most economical energy use, espcially short distances. It is why OceanPro is promoting local fish
Truck between 500m and 1000 miles	**7**	Some products are both air frieghted and then truck freighted - others are driven to market without use of any other medium - these
Truck between 1000 and 1500 miles	**10**	
Truck greater than 1500 miles	**13**	
Ocean Frieght Americas	**3**	Frozen product travels to market using rail or ocean frieght - usually shipped in large quanitites, the carbon energy to move individual fish is significantly lower than air or truck. Most product brought to US by these means musty also be trucked to final destination.
Ocean Frieght Asia and Europe	**4**	

Refrigerant Use

Refrigeration is a mechanical process that uses energy to create lower temperatures. There are two proven methods - one straight mechanical and the gas based. The gas based (Ammonia) system used considerably less carbon energy to operate, and thus those processing and storage facilities that store using Amonia based systems are

Ammonia Based	**0**	
Freon based	**1**	

Distributor Freight Efficiency

Once a product is brought to market, a local distributor is used to deliver the product to the individual restaurant/foodservice unit. Distributers use different methods to store and transport their product. This section accounts for the use of energy at the distruibutor level. Some distributors are pro-active in their approach to energy use and therefore have a better rating than others. This section evaluates the local distributor. Carbon ioffset credits are available to be purchased by distributors - the monies paid for these offsets are used to help re-populate forests, prevent deforrestation and add beneficially to the environment.

Energy Efficiencies rating for Distributor*		
arbon Fishprint Offset Credits - anywhere in process		

Section Total - -

Whenever a product is processed, either maintaining it in its state (like freezing a fish) or changing the state of the product (like smoking) energy is used in this processed. That ebnergy requires carbon usage and is included as a component in the Oceanpro Industries Carbon Fishprint scale. Processing can use multiple stages which each require energy - like smoked fish which will use both heat to cook and blast refrigeration to cool - a ratuing for each process is included. Freezing techniques can also use a second process to ensure product quality or characteristic integrity - this second ior third process will also use enegry. And of course being a processed ppriuct usually requires raw material to shipped to processing plant which adds an additional use of carbon energy.

Further Processed Product

Raw Material Shipping

Additonal raw material is required to make some products - that raw material must be brought to the processing center - this too requires some Carbon Energy output. The distance the product must travbel to get to the processor is taken into consideration here. An example would be breading for the pre-breaded cod fillet - the breading is produced in midwest and shipped to processors on west coast . * Special requirements explained in notes section below.

Less than 500 miles	**2**	
greater than 500 miles	**4**	
special procurement requirements*		

Freezing process

Just as in storage, when processing a product, the method for cooling to final state is taken into consideration. Some use nitriogen tunnels, others use blast freezers and still others use the old fashion method of putting in a freezer that is below zero degrees.

State of Art	**3**	
Slow method	**5**	

The plant where products are further processed can have a good energy use plan - here credit is given if such a plan is proven and is in operation and points are added forr those plants that antiquated and inefficent - from an energy point of view.

Processing plant Efficiency

Conversion processing

Some products take two steps to be market ready - a frozen smoked fish must be smoked, using energy in this step and must also be frozen, also using energy. Other products can have three steps, coating, cooking and freezing. This section adds points for those products with multiple processing steps. Each step, regardless of how minute consumes some crabon energy - we try to capture that fact here.

Single State processing
Multiple Stage processing

Section Total - -

OceanPro Industries Carbon Fishprint Rating -

*Rating based on below evidence - amount manually entered

Product Destination Descrion

Oceanpro Indurstries Category Averages
Fresh Fish
Shellfish (includes Lobsters, Scallops and Crab)
Shrimp
Frozen Fish
Processed Products