

Exercise RECP: Data Collection for KPI calculations in a fish processing company



You are the manager of a fish filleting company. During a RECP project, you are developing the baseline, the RECP profile.

The company is an on-shore facility that produces fillets of white fish. The company purchases gutted chilled fish from the local fisheries. Key process steps include:

- (1) Pre-treatment including removal of ice, de-scaling, washing and de-heading,
- (2) Filleting, trimming and cutting,
- (3) Packaging in 10 kg blocks in waxed cartons, stacked on pallets,
- (4) Freezing and storage,
- (5) Distribution to wholesalers.

Resource use and pollution:

- The filleting process consumes large quantities of water. Water is used for transporting fish, by-products and waste, for cleaning the plant and equipment, for washing raw material, and for de-icing.
- Energy is used for operating machinery, freezing, heating, and cooling.
- Main material inputs include fish and packaging.
- Effluent streams from fish processing contain high loads of organic matter (oils, proteins, suspended solids, phosphates, nitrates).
- Effluent sources include handling and storage of fish before processing, transport of fish and products around the plant, defrosting, scaling, filleting, cutting of fish, washing fish products, and cleaning.

In 2018, the company used 300,000 kWh of electricity per year (electricity generation in the area is primarily based on hydropower and according to the energy utility, 0.021 kg CO₂ is generated per kWh). The company also used 30,000 litres/year heavy fuel oil (Calorific value 11.66 kWh/litre, CO₂ of 0.28 kg/kWh) for heating and hot water.

In 2018, the company purchased 2,598 tons of fish and 1.25 tons of chemicals (of which 1,000 kg were used in 2018 and 250 kg was stored on-site and was used in 2019). The company purchased 5,000 kg of packaging in 2018 and used 5,000 kg of packaging that was purchased in 2017. The company got back 5,000 kg of packaging used in 2018 from customers and reused this during the same year.

In 2018, the company paid USD 42,500 for water at a unit cost USD 0.5 per m³, the company extracted 250,000 litres of water from an on-site well and harvested 250,000 litres of rainwater.

The company generated solid waste consisting mainly of leftovers from the filleting process. According to company estimations, for each ton of raw material approximately 40 kg scales, 250 kg heads, 320 kg bones, and 20 kg scraps ended up as waste. 100 tons of the waste were sold to a local pet food producer, 5 tons were sent to external recycling and the 1,395 tons of waste were sent to landfill.

The company processes approximately 1.3 tons of fish per hour and is in operation 8 hours a day for 250 days per year. In 2008, the company produced 1,000 tons of fillets.

Please prepare the baseline RECP profile for this fish processing company, in particular:

- Material productivity
- Energy productivity
- Water productivity
- Carbon intensity
- Wastewater intensity
- Waste intensity

Resource inputs			Waste and emissions		
	Type	Quantity		Type	Quantity
Materials			Waste		
	Total materials use			Waste	
	Material productivity			Waste intensity	
Energy			Air emissions		
	Total energy use			Total air emission CO₂	
	Energy productivity			Carbon intensity	
Water			Waste water		
	Total water use			Total waste water	
	Water productivity			Waste water intensity	
			Annual production		

Model solution: Fish processing company

Resource inputs for 2018			Waste and emissions for 2018		
	Type	Quantity		Type	Quantity
Materials	<i>Fish</i>	2,598 t	Waste	<i>Organic waste</i>	Approx. 1,600 t
	<i>Chemicals</i>	1 t			
	<i>Packaging material</i>	15 t			
	Total materials use	2,614 t		Waste	1,600 t
	Material productivity¹	0,38 t/t		Waste intensity²	1.6 t/t
Energy	<i>Electricity</i>	300,000 kWh	Air emissions	<i>CO₂ from electricity</i>	6.3 t
	<i>Heavy fuel oil</i>	348,800 kWh		<i>CO₂ from fuel oil</i>	97.7 t
	Total energy use	648,000 kWh		Total air emission CO ₂	104 t
	Energy productivity	1,5 t/MWh		Carbon intensity	0.1 t/t
Water	<i>City water</i>	85,000 m ³	Waste water	<i>Waste water</i>	85,000 m ³
	<i>Well water</i>	250 m ³		<i>Chemicals</i>	1 t
	<i>Rainwater</i>	250 m ³			
	Total water use	85,500 m ³		Total waste water	85,001 m ³
	Water productivity	0,012 t/m³		Waste water intensity	85 m³/t
			Annual production		1,000 t

¹ Product per unit of input

² Waste per production