

Water

Water and steam are used in Neste Oil's refining operations, and water usage is monitored constantly in terms of parameters such as input flows, water usage efficiency, and cooling water and wastewater management. No direct targets for water usage have been set, as usage forms an integral part of refining processes, safety, and energy consumption. For example for the reasons mentioned above, reducing water consumption is not an end in itself.

The majority of Neste Oil's water usage, around 96%, is linked to the company's refineries while the rest is used at terminals, in shipping, and by the station network. The bulk of refinery usage is linked to fossil petroleum products. Refining renewable fuel is very water-efficient, in comparison, as water is almost only used in these operations to generate steam. Because of its size, the Porvoo refinery, which produces both fossil and renewable fuel, is Neste Oil's largest single water user.

	2013	2012	2011
Water usage ¹⁾ (m ³ /a)	8,392,000	7,430,000	7,628,000
Wastewater (m ³ /a)	9,141,000	9,904,000	9,100,000

¹⁾ Excluding cooling water.

The sources for the water Neste Oil uses are:

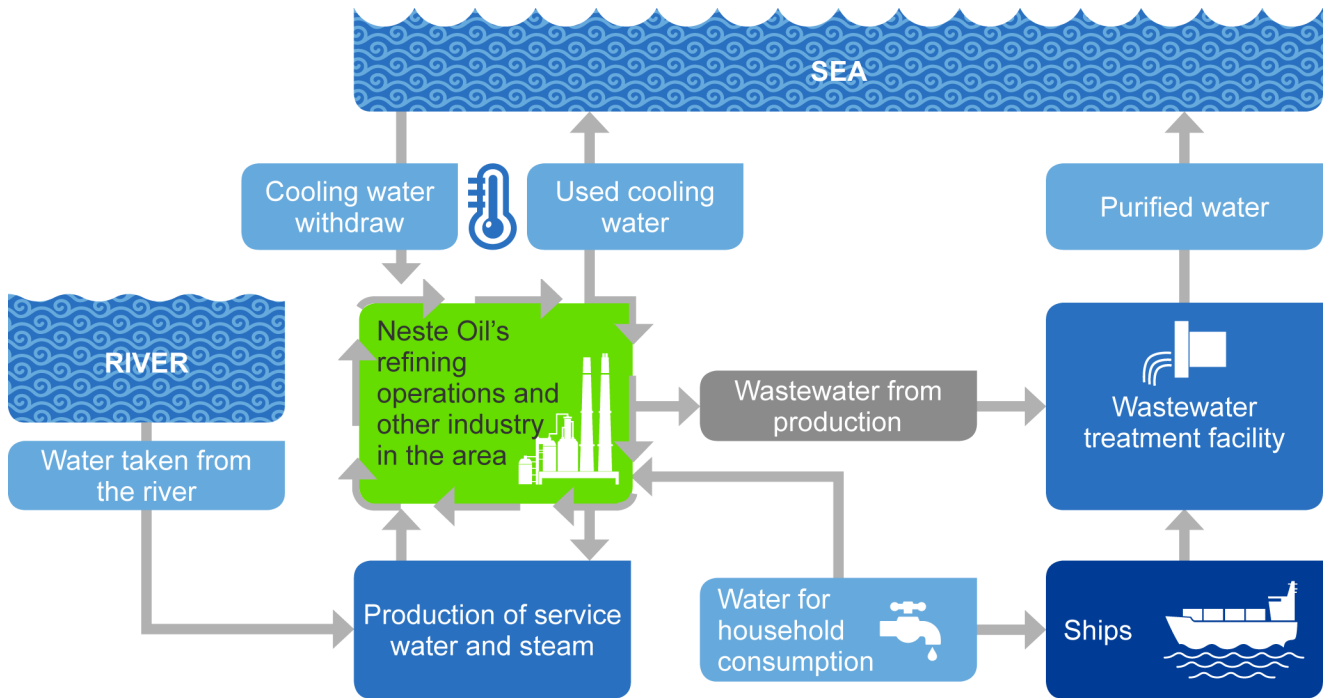
- the River Maas in Rotterdam
- the River Mustijoki in Porvoo, and
- the River Kokemäenjoki in Naantali.

The refinery in Singapore primarily uses recycled wastewater; the rest of its water needs are met by rainwater, surface water purchased from Malaysia, and desalinated seawater, all provided by the Public Utilities Board.

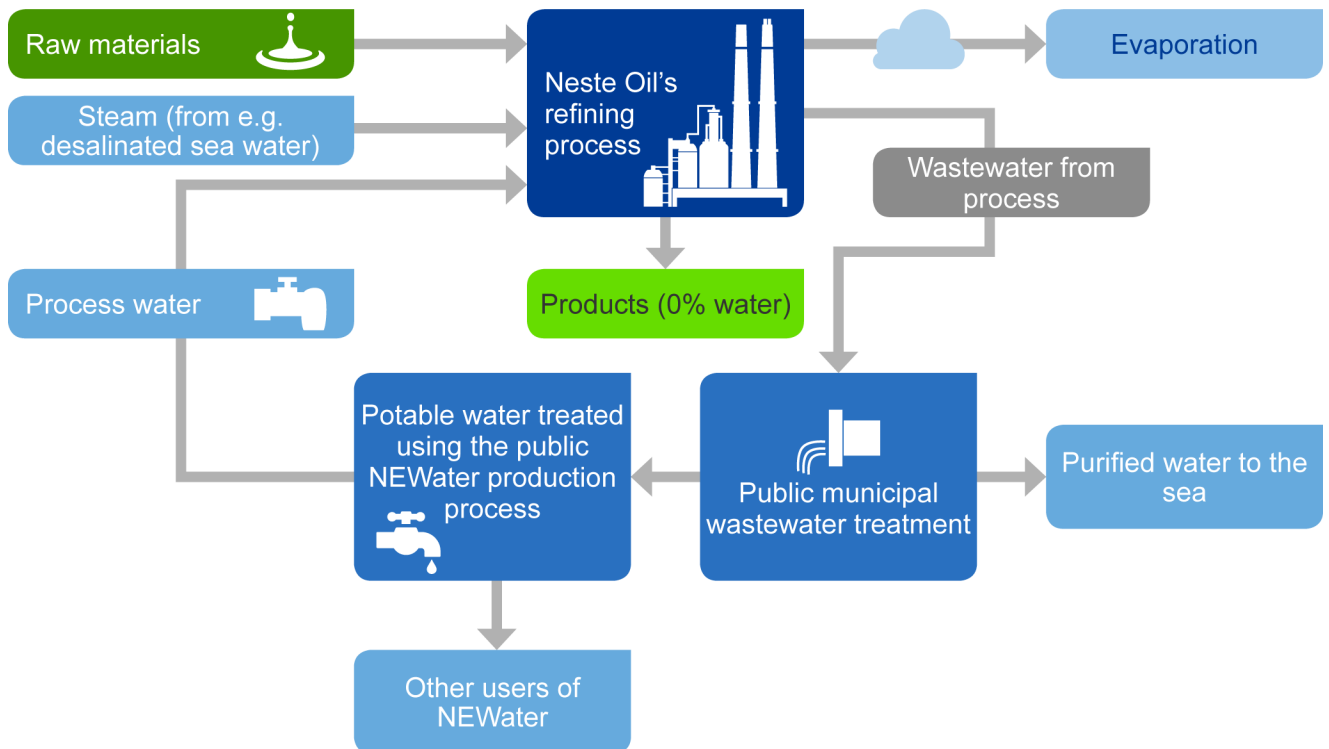
Water balance calculations have been produced for Neste Oil's refineries covering the inputs and outputs at these sites and the volumes of the most important water flows there. Neste Oil's long-term plan is to develop and introduce a water balance tool that will enable water usage per product or production line to be calculated, including the complex Porvoo refinery.

Water reporting at the Rotterdam and Singapore refineries was enhanced during 2013 and now also covers areas such as the source of the water and steam used, the various factors affecting the loading of wastewater flows, and the quality and volume of wastewater.

Water cycle at the Porvoo refinery



Water cycle at the Singapore refinery



Wastewater treatment at Neste Oil's refineries

Treated wastewater is discharged into waterways in Porvoo, Naantali, and Rotterdam refineries. Before being discharged into waterways, all wastewater passes through on-site treatment

plants featuring physical-chemical and biological processes. Following pretreatment, wastewater from the Singapore refinery goes to a local Public Utilities Board treatment plant, where it is treated for re-use.

Waterborne emissions (t/a)

	2013	2012	2011
Oil	1.4	3.6	1.4
Chemical oxygen demand (COD)	497	306	317
Nitrogen	49	49	45
Phosphorous	1.4	2.5	2.6

The buffer capacity of the wastewater treatment facility at the Naantali refinery will be increased during 2014 by converting an old oily water storage tank into a buffer tank. A new storage tank for holding oily water was commissioned in 2013. The efficiency of the refinery's wastewater plant has also been enhanced by modernizing its chemical treatment. The plant's oxidation pond will be dredged in 2014 to ensure the quality of the wastewater discharged into the sea at the site. Wastewater pretreatment systems prior to discharge to public sewers were enhanced in Singapore in 2013.

Using cooling water in refinery operations

All of Neste Oil's refineries employ closed-cycle cooling systems. The process water in these systems is cooled using seawater or air cooling. Seawater is used at all the company's refineries except in Rotterdam, where cooling water is bought in from an outside supplier. Seawater is returned to the sea after use.

The temperature of cooling water increases during the cooling cycle and adds a thermal load to discharge areas when it is returned to the sea, which can affect ice cover during the winter. A three-year study monitoring ice cover off the Porvoo refinery, carried out between 2010 and 2013, showed that cooling water discharged by companies in the Kilpilahti industrial area could reduce the time when ice can be walked on safely by a few days annually.

A fisheries study related to the use of cooling water by plants in the Kilpilahti area continued in 2013. Cooling water used by Neste Oil's refinery has not been shown to have a significant impact on fish catches in the area.

Helping develop water awareness across the industry

Neste Oil strives to promote water awareness both within its own organization and the oil industry generally; and took part in a development project coordinated by CONCAWE aimed at improving the industry's understanding of water usage and the impact of wastewater and cooling water in 2013. Neste Oil also continued to participate in development work on the ISO 14046 water footprint standard, following on from its involvement in 2012.

Water issues in renewable feedstock procurement

Water issues are always taken into account when selecting which renewable inputs Neste Oil uses. A review of water-related risks was incorporated into the review process used when assessing the suitability of potential renewable feedstock suppliers in 2013. Neste Oil's experts monitor research on the water consumption characteristics of different crops and agricultural areas producing renewable inputs. Water issues are also reviewed when selecting suppliers, and palm oil suppliers, for example, are required to monitor their water usage regularly.

Monitoring waterways

Neste Oil has monitored the sea areas off its refineries in Finland and the quality of the water there for many years, in collaboration with outside experts. Monitoring covers water quality, the organisms found on or near the seabed, and local fisheries. No changes compared to the good results recorded in previous years were observed during 2013. The authorities are responsible for monitoring marine conditions in Rotterdam.