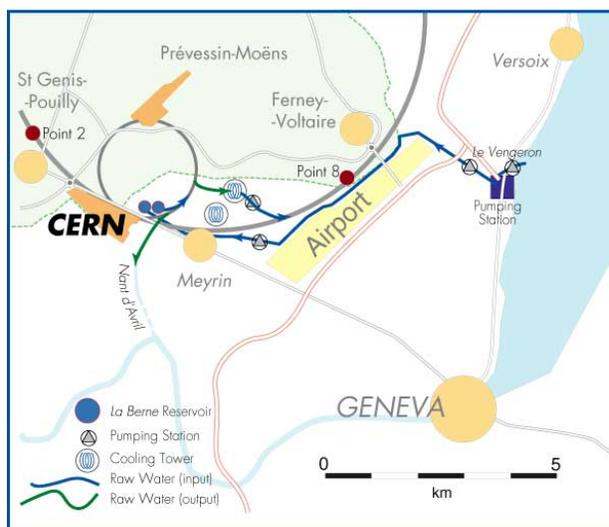


# 2013 CERN Water Consumption

The water is supplied to CERN from Lake of Geneva by a pumping station located in Vengeron (CH) by the Services Industriels de Genève (SIG). On some SPS Points (BA2, BA4) and on all the LHC Points, drinking water is supplied by the local French network for sanitary use and to ensure redundancy on the fire extinction network.



The total water consumption in 2013 amounted to almost 3.6 Mm<sup>3</sup> which represents a decrease of around 30% with respect to 2012, i.e. 1.5 Mm<sup>3</sup>. The reasons for such reduction are mainly linked to the stop during extended periods of time of several cooling systems such as the SPS cooling loop from July to September, the production of demineralized water from May to August and cooling towers for at least 3 months each in LHC as well as in the PS accelerators complex. Additional savings have been achieved intervening on small to medium size air conditioning systems in the Meyrin site that were on an open loop configuration. In LHC Point 6, the balance of the consumption is not available: this is due to the correction made by the local water supplier that overestimated the water consumption in 2012; however this consumption is minor with respect to the total volume for all CERN.

The water is mainly used on the CERN sites for cooling purposes or industrial usage as well as for sanitary installations. The resulting effluents, together with natural meteoric and infiltration waters are evacuated from the CERN sites in a controlled way.

## Cooling water

The cooling water is either used as it is supplied (raw water), or is processed (demineralized water) and used in secondary circuits cooled by cooling towers using heat exchangers.

With the aim of keeping the water consumption low, the cooling water is circulated in closed loops that periodically require the addition of raw water to compensate for the evaporation in the cooling towers. Also, in case of excessive mineralization, the water in these circuits can be discharged and evacuated from the CERN site.

In addition, according to the legislation in force, water in the CERN atmospheric refrigerants is regularly checked for the Legionella and preventive treatments with biocides, respecting the applicable standards for water quality protection, are carried out.

## The Water Distribution Network

Three pumping stations, all located in Point 1 of the LHC opposite to the main entrance, ensure most of the water distribution to all the CERN sites. These are:

1. The pumping station (P1) dedicated to the SPS and serving all technical equipment in the SPS and its surface buildings. This is a pure circulation pumping system, which during 2013 has circulated slightly less than  $7 \text{ Mm}^3$  in the SPS, i.e. one third of the volume in 2012.
2. The pumping station (P2) is dedicated to the LHC and serves all the technical equipment in the LHC and its surface buildings. It pumps water made available by the Vengeron pumping station owned by the Service Industriels de Genève.
3. The pumping station (P3) is for the sanitary and technical needs in both the Meyrin and the Prévessin sites. Like the previous pumping station, it pumps water made available by the Vengeron pumping station owned by the Service Industriels de Genève.

In addition, the French (S4) and Swiss (S5) water distribution networks supply some of the SPS and LHC surface sites as detailed in the tables below.

SPS - 2013			Total
	Source	Origin	[m <sup>3</sup> ]
SPS BA2	S4	F	487
SPS BA4	S4	F	1'688
SPS BA5	S5	CH	108
<b>Total</b>			<b>2'283</b>

The water consumption in the SPS Points is for sanitary use only. The water to compensate for the evaporation in the cooling towers is given in the table for the water consumption of the Meyrin and Prévessin sites.

LHC - 2013	Source	Origin	Total [m <sup>3</sup> ]
LHC Complex	P2	CH	230'023
LHC Point 2	S4	F	3'908
LHC Point 3.2, 3.3	S4	F	479
LHC Point 4	S4	F	3'717
LHC Point 5	S4	F	14'699
LHC Point 6	S4	F	0 <sup>(*)</sup>
LHC Point 7	S4	F	114
LHC Point 8	S4	F	5'507
			<b>626</b>
<b>Total</b>			<b>258'447</b>

(\*) Value not available

The water consumption for the LHC Complex is mainly used to compensate for the evaporation in the cooling towers of the LHC Points. The water consumption in the LHC Points, 28'424 m<sup>3</sup> in total, is mainly for sanitary use and for backup of the surface network for the hydrants in case of fire. Given the very low demand on the LHC loop, the water for LHC has been provided for extended periods by the WS NET and the corresponding volume, is not included in the above table.

The variations of water consumption in the LHC Points with respect to previous years or between two Points are mainly due to the number of people present on the sites, in particular in some of the Points the planned interventions for maintenance or works during LS1 have been quite limited. No major leaks have been observed during 2013 in these points.

Meyrin & Prévessin 2013			Total [m <sup>3</sup> ]
	Source	Origin	
Meyrin and Prévessin sites main supply, SPS BA1 and BA6, LHC Point 1	P3	CH	3'339'781
Safe supply	S5	CH	1'398
Clubs	S5	CH	1'115
Globe	S5	CH	464
<b>Total</b>			<b>3'342'758</b>

The first row of this table also includes the water to compensate for the evaporation in the cooling towers of the SPS. The increase in the consumption for the main sites is explained by several causes: the need of refilling several circuits that have been drained for works during LS1, the use of water on open circuit to cool some equipment for a limited period of time while the main circuit was object of modifications and by the fact that it includes the LHC consumption when water is provided by the WS-NET.

Several small air conditioning units using drinking water as coolant have been renewed in 2013; their total nominal consumption being around 30 m<sup>3</sup>/h, will allow a yearly saving of some tenth of thousands of cubic meters.