

Free-cooling for Data Centers

Worldline

Worldline implements a free cooling process for its Vendôme (France) datacenter to reduce its electricity consumption and therefore its CO2 emissions.

Starting date of the project	May 2019		
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	The project was implemented in Worldline's data center at its site in Vendôme, Loir et Cher.		
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Improving data centers energy performance, particularly with regard to the cooling process in order to reduce data centers carbon footprint.		
Detailed project description	Electricity consumption is one of the main environmental impact of a data center. The project consists of replacing standard air conditioning with "Free Cooling" technology, a cooling solution using direct injection of outside air, when weather conditions allow, generally between April and September. The configuration of the Vendôme building and the positioning of the Air Handling Units (AHUs) which capture and filter outside air make this solution possible. This naturally cool air greatly reduces the energy consumption of the air conditioners.		
Main project's drivers for reducing the greenhouse gas emissions	Reduction levers	Details on the aspects of the project	
	☐ Energy and resource efficiency (including behaviour)		
	☐ Energy Decarbonisation		
	☒ Energy efficiency improvements	Lower electricity consumption thanks to "Free cooling" technology for an equal level of service.	
	☐ Improving efficiency in non-energy resources		
	☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)		
	☐ Financing low-carbon producers or disinvestment from carbon assets		
	☐ Reduction of other greenhouse gases emission		
Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope	Aspects of the project contributing to the reduction of emissions by emission category		Quantification of associated GHG emissions by emission category
			Please follow the quantification methodology used in the Afep guidelines .
	Reduction of the company's carbon dependency		
	Scope 1 <i>Direct emissions generated by the company's activity.</i>		
	Scope 2 <i>Indirect emissions associated with the company's electricity and heat consumption.</i>	Lower electricity consumption thanks to "Free cooling" technology for an equal level of service.	50 tCO2/an (en 2020)
	Scope 3 <i>Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.</i>		

	Increase of carbon sinks	
	Emissions Absorption <i>Carbon sinks creation, (BECCS, CCU/S, ...)</i>	
	GHG emissions avoided by the company at third parties	
	Avoided Emissions <i>Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.</i>	
	Clarification on the calculation or other remarks: The energy savings are mainly linked to the implementation of free cooling. However, other energy efficiency projects have been carried out in parallel. In 2019, electricity consumption was reduced by 5.37% (i.e. a saving of 459586 kWh) and 32 tons of CO2 equivalent were avoided. It should be noted that since the project started during the year, the full benefits were not achieved until 2020. In 2020, electricity consumption was reduced by 8.51% (i.e. a saving of 728320 kWh) and 51 tons of CO2 equivalent were avoided. The emission factor of the French grid electricity used comes from the International Energy Agency: 69.4g CO2e/kWh. NB: Free cooling reduces the use of certain air conditioning equipment, in particular compressors and dryers, which could lead to an extension of their life span and a reduction in maintenance costs. It is not yet possible to precisely quantify the frequency of equipment replacement following the implementation of "Free Cooling".	
Modality of verification of the quantification.	Calculation standard used (ADEME base, GHG protocol, etc.): IEA's emission factors Verification of the calculation (internal or external): Internal verification	
Other environmental and social benefits of the project	In the long term, this project will also reduce indoor noise pollution for the employees working on this site because the air conditioning compressors are actually too noisy.	
Project maturity level	☐ Prototype laboratory test (TRL 7) ☐ Real life testing (TRL 7-8) ☐ Pre-commercial prototype (TRL 9) ☒ Small-scale implementation ☐ Medium to large scale implementation	
	Remarks: The project has so far only been implemented in one of Worldline's data centers.	
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	Free cooling requires a special building design. To implement this technology, the site must have large downdraft columns, high false floors to allow the circulation of large volumes of air, and an adapted fire extinguishing system. The project is hard to deploy in data centers that do not have this type of building configuration.	
Amount of investment made (in €)	40 000€	
Economic profitability of the project (ROI)	☒ ST (0-3 years) ☐ MT (4-10 years) ☐ LT (> 10 years)	
	Remarks: The project implemented in May 2019 was cost effective by May 2020.	
Engaged partnerships	/	
Open comments from the project owner	Additional investments will be made, to install air extractors in the computer room. This would improve the air flow and bring the temperatures down from 22° to 18°.	
More about the project		
Contact the company carrying the project	Pierre Decrocq : pierre.decrocq@worldline.com	
Project URL links	/	
Illustrations of the project		

