CO2-avoidance displayed by relocating your data load from your current conventional data centre in selected country to AQ Compute's Data Centre in Norway is exemplary calculated as follows:

CO2e-emissions of your HPC needs by conventional data centre in selected country

The CO2e-emissions (in tCO2e/a) of your HPC needs as displayed in the kW-slidebar for the conventional data centre in the country you selected, are calculated based on the country's electricity grid mix of the year 2020[1] and their respective underlying CO2e-emissions, also taking into account CO2e-emissions resulting from the fuel consumption of the back-up generators.[2]

Comparison with AQ Compute's air-cooled Data Centre Norway

The CO2e-emissions of the same HPC needs relocated to AQ Compute's Data Centre in Norway with air cooling technology are calculated with the same methodology, considering renewable energy supply and underlying CO2e-emissions, also taking into account CO2e-emissions from the fuel consumption of the back-up generators[3] ("**AQ Compute´s air-cooled Data Centre Norway"**).

The CO2e-avoidance figure is calculated by subtracting the annual CO2e-emissions calculated for AQ Compute's air-cooled Data Centre Norway from the annual CO2e-emissions calculated for the conventional data centre in the chosen country ("**AQ Compute´s air-cooled data centre CO2e avoidance figure**").[4]

Additional consideration of water cooling and/or heat recovery at AQ Compute´s Data Centre Norway

When activating the water cooling and/or heat recovery switches on this webpage, calculations for the CO2e avoidance figure contain the additional subtraction of CO2e-emissions resulting from the higher efficiency from water cooling and heat recovery technology **("AQ Compute´s water-cooled/heat recovery data centre CO2e avoidance figure").**[5] This further CO2e avoidance can be obtained by including AQ Compute´s water cooling and/or heat recovery concept. For both concepts the CO2e avoidance are based on Cloud&Heat Technologies GmbH experience and from known values of operational data centres. The calculation for the heat recovery is further based on a concept that no average heating system is used but the waste heat from the data centre[6] ("**AQ Compute´s water cooling and/or heat recovery concept**").

[1]CO2e emissions in each country based on the energy mix of the relevant country, Carbonfootprint.com, 2020
[2]Diesel CO2e emissions from back-up generators, Jakhrani et al., 2012
[3]Norway's energy mix consists of 100% renewable sources: 93.4% is generated through hydropower, the rest is generated from thermal power and wind power, Norwegian energy regulatory authority
[4]CO2e emissions in each country with a conventional data centre calculated from country specific electricity emission factors based on the energy mix of the relevant country, Carbonfootprint.com, 2020; European Energy Agency, 2020; Umweltbundesamt, 2019
[5] Average new built European data centre PUE value: 1.3 – https://journal.uptimeinstitute.com/data-center-pues-flat-since-2013/ ; Calculated designed PUE for
AQ Compute air cooling: 1.16
AQ Compute water cooling, based on Technology from on Cloud&Heat Technologies GmbH: 1.054
AQ Compute water cooling, incl. Heat recovery, based on Technology from on Cloud&Heat Technologies GmbH: 1.047
[6] Whitepaper Cloud&Heat Technologies: Using the Cloud&Heat Cooling System with Waste Heat Utilization: https://www.cloudandheat.com/wp-content/uploads/2020/02/2020_CloudHeat-Whitepaper-Cost-saving-Potential.pdf

Equivalent forest surface

Since CO2e emissions are usually compensated by planting trees, those values can be translated into the surface of forest which should be planted to compensate them.[7]

General information

The "**AQ Compute´s air-cooled data centre CO2e avoidance figure"** and the "**AQ Compute´s water-cooled/heat recovery data centre CO2e avoidance figure**" are approximate figures and do not necessarily reflect the exact impact of the **AQ Compute´s air-cooled Data Centre Norway** and **AQ Compute´s water cooling and/or heat recovery concept**").

The largest contributing factor to any possible calculation inaccuracies in our methodology is the accuracy of the electricity grid emission factor for a particular region, which is calculated using average generation capacity or average generation. Published grid electricity emission factors may vary against actual or may be altered or updated from time to time. The most common reasons for variances or inaccuracies in emission factors include the accuracy of the published source data, the reduction of actual electricity generated on the grid, increased generation capacity from the addition or removal of generation sources that have higher or lower emission factors than the grid average and the progressive and relative increase in renewable energy generation sources, generally.

The above sources of information are believed to be reliable and accurate, however, the completeness, accuracy, validity, and timeliness of the information provided cannot be guaranteed and Aquila Capital (meaning Aquila Capital Holding GmbH and its affiliated companies within the meaning of §§ 15 et seq. Stock Cooperation Act) accept no liability for any damages that may arise directly or indirectly from the use of this information.

[7] 1t CO2e emissions are equivalent to 11 ha mixed forest – https://www.baysf.de/de/wald-verstehen/wald-kohlendioxid.html