A1 Group
Report on Water Risks based on Aqueduct Tool by WRI

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Report on Water Risks based on Aqueduct Tool

We at A1 Group consider water as a basic human right. With this in mind, we want to make sure that our actions leave no consequences for the local water reservoirs. Water is a highly valuable, finite resource and water scarcity poses a major threat to humanity and economic development. Building on the Group's Environmental Policy, this report further elaborates on how A1 Group mitigates risks related to the use of water.

Since 2013 A1 Group has been a member of the UN Global Compact (UNGC) thereby incorporating its principles into strategy, culture, and operational activities. As such, we are dedicated to monitoring the state of water under our direct impact and voicing responsible water use in our wider supply chain. By disclosing a Report on Water Risks we at A1 Group aim of supporting UN Sustainable Development Goals (UN SDGs) through the disclosure of resource management in the private sector.

1. ICT Industry & Water Use

The ICT sector is overall considered as a large energy consumer due to omnipresent digitalization for example in digital end devices, Data Centers, and networks[1].

At the same time, the ICT sector records the largest purchases of renewables[2]. In accordance with that, A1 Group is determined to reduce its own CO_2 impact and enable a transition to renewable energy. This is reaffirmed by our external commitments, such as SBTi (Science Based Targets Initiative).

Yet, the transparency of energy consumption especially concerning the topic of water in the ICT industry could be increased. Water use for energy generation in the ICT sector could pose difficulties as it represents challenges concerning the credibility of transparent reporting. A1 Group tries to tackle this lack of transparency by regularly publishing a Climate Scenario Analysis. Looking at the results of the most recent Climate Scenario Analysis only North Macedonia and Serbia were rated as having moderate water-related risk, i.e. Flood Risk.

The purpose of this report is to outline and disclose potential risks related to water consumption.

With climate change and the increased possibilities of floods, we acknowledge the potential for net infrastructure to come at risk. A1 Group is aware of this global challenge that telecom operators might face. For example, Physical Risks such as hurricanes pose an immense risk to infrastructure and may also cause water-related problems such as flash floods and landslides. This was seen in South America, where numerous hurricanes in the last couple of years e.g. Hurricane Maria in Puerto Rico considerably affected América Móvil's operation in Puerto Rico.

The following chapters explore A1 Group in the context of water use and give an outline of the Aqueduct WRI Tool for risk assessment, which maps different risks related to water, based on geo-locations. Following the results of the Climate Scenario Analysis, which mapped North Macedonia and Serbia as countries with moderate water-related risk, we looked further into water use within these two countries. In these two countries, A1 Group owns two (2) data centers (DC): DC Kragujevac, Serbia, and DC MTX Skopje, North Macedonia. Further investigation revealed that only DC Kragujevac reports water use within the DC. However, this is only a minimal annual water usage for comfortable air conditioning (the cooling for the rooms where employees stay). In the final chapters of the report, those results are reviewed and subsequently a conclusion is drawn concerning the risks related to water for A1 Group.

[1] TAB. (2022). *Energy consumption of ICT infrastructure* (TAB-Fokus no. 35-198). Office of Technology Assessment at the German Bundestag. https://publikationen.bibliothek.kit.edu/1000152733/149665028

[2] Mytton, D. Data centre water consumption. *npj Clean Water* **4**, 11 (2021). https://doi.org/10.1038/s41545-021-00101-w

2. A1 Group Water Consumption in own Operations

The following table gives an introduction to the topic of water use at A1 Group. The table shows A1 Group's total water use in megaliters (ML) as well as a split according to the company's operating countries. Data is also shown in millions of euros (M€). Both data sets show the sequence of three (3) years.

GRI 303-5: Water consumption

Period	2019	2020	2021	2022
Total water use in ML	233	251	224	230
Austria	154	168	156	159
Belarus	16	12	8	9
Bulgaria	30	33	22	26
Croatia	20	20	21	16
North Macedonia	0	9	10	10
Serbia	9	6	5	7
Slovenia	3	2	2	2
A1 Digital	0	0	0	0
Total revenue in M€	4,627	4,599	4,792	5,074
Austria	2,648	2,622	2,678	2,752
Belarus	426	403	420	461
Bulgaria	486	514	574	640
Croatia	433	428	452	470
North Macedonia	123	122	122	141
Serbia	284	286	315	357
Slovenia	209	205	210	223
A1 Digital	18	20	22	31
Water use per unit of revenue	0.050	0.055	0.047	0.045
Water use: m3 per unit of revenue (M€)	50.31	54.59	46.84	45.34

3. Aqueduct WRI Tool for risk assessment

3.1 What is the Aqueduct Tool by WRI?

Water Resources Institute (WRI) is a global research organization cooperating with businesses, governments, civil society groups, and multilateral institutions. The organization's goal is to establish solutions for better living standards and nature thrive. Global challenges tackled by the organization include Cities, Climate, Energy, Food, Forests, Ocean, and Water. Those topics and the associated challenges are managed through four WRI Centers of Excellence: Business, Economics, Equity, and Finance.

Water risks such as droughts, floods, and water stress are mapped and identified through the Aqueduct tool. This tool aims to improve water resource management ensuring sustainable growth in a world where water is a constrained supply.

Aqueduct Water Risk Atlas by WRI provides publically available data concerning water risks and shortages which represent a global challenge. The aqueduct directly analyses the area where the Data Center, in this case, the Data Center Kragujevac in Serbia, is and gives current and future water outlooks for that particular geo location in the context of water-related risks.

3.2 Risk Mapping Description

Baseline Water Risk in Data Center Kragujevac

Risk Type	Risk Scale	Risk Label	Category	Conclusion
Physical Risk Quantity	0 to 5	Medium - High (2-3)	2	moderate risk
Baseline water stress	**<10% to >80%**	Low - Medium (10-20%)	1	minor risk
Baseline water depletion	<5% to >75%	Low (<5%)	0	no risk
Interannual variability	<0.25 to >1.00	Medium - High (0.50-0.75)	2	moderate risk
Seasonal variability	**<0.33 to >1.33**	Low (<0.33)	0	no risk
Groundwater table decline	<0 cm/y to >6 cm/y	Insignificant Trend	0	no risk
Riverine flood risk	0 to 1 in 1,000 to more than 1 in 100	High (6 in 1,000 to 1 in 100)	3	higher risk
Coastal flood risk	0 to 9 in 1,000,000 to more than 2 in 1,000	Low (0 to 9 in 1,000,000)	0	no risk
Drought risk	0.0-0.2 to 0.8-1.0	Medium - High (0.6-0.8)	3	higher risk
Physical Risk Quality	0-1 to 4-5	High (3-4)	3	higher risk
Untreated connected wastewater	<30% to 100%	High (90-100%)	3	higher risk
Coastal eutrophication potential	<-5 to >5	High (1 to 5)	3	higher risk
Regulatory and Reputational Risk	0-1 to 4-5	High (3-4)	1	minor risk
Unimproved/no drinking water	<2.5% to >20%	Low (<2.5%)	0	no risk
Unimproved/no sanitation	<2.5% to >20%	Medium - High (5-10%)	2	moderate risk
Peak RepRisk country ESG risk index	<25% to >75%	Low - Medium (25-50%)	1	minor risk
Overall water risk	**0 to 5**	**Medium - High (2-3)**	**2**	**moderate risk**

Risk types are explained in detail in Annex.

In this chapter when talking about risks, we are talking about risks according to the Aqueduct Tool by World Resource Institute.

The overall water risk is subdivided into Physical Risks Quantity, Physical Risks Quality, and Regulatory & Reputational Risk in the Baseline. Physical Risks related to quantity contain the variables water stress, water depletion, interannual variability, seasonal variability, groundwater table decline, riverine flood risk, coastal flood risk, and drought risk. Physical Risks related to quality are subdivided into untreated connected wastewater and coastal eutrophication potential. Regulatory & Reputational Risk includes variables such as unimproved/ no drinking water, unimproved/ no sanitation, and Peak RepRisk country ESG risk index.

The different risk types also have different scales for how they are being measured. To make those different scales comparable labelling and categorization are used. When risks are categorized as "Zero Risk" that means that no risk associated with a certain criteria is recorded or expected. When the risk is categorized as "Five Risk", this is considered an extreme risk and high exposure for the specific criteria observed.

As for the timeframe, the tool allows choosing between the annual and monthly scenarios.

Further, more detailed definitions are provided in the Annex section of this document.

3.3 Future Water Risk in Data Center Kragujevac

In the Future related model three different scenarios, namely Pessimistic, Business as usual, and Optimistic can be chosen. Also, as for the future, you can either choose 2030 as a scope or 2040. As of unit of measurement, you can either tick the absolute value or change from the baseline. In terms of indicators, users can select Water Stress, Seasonal Variability, Water Supply, and Water Demand.

Seasonal variability: Both in 2030 as well as in 2040 scope in all three scenarios seasonal variability will increase by 10%. The only exception is the optimistic view of 2030 where seasonal variability will remain the same.

Water supply: In both scopes 2030 and 2040 and in all scenarios water supply will decrease by 20%.

Water demand: In line with the fact that seasonal variability increases, also the water demand will increase in both scopes as well as in all scenarios. The increase differs between 20 and 40%.

Water stress: As seasonal variability and water demand increase water stress also increases in all three scenarios. In the 2030 scope the increase is 40% whereas in the 2040 scope it differs between 40% and 100%.

4. Results Review and related Conclusions

Concerning the baseline the overall water risk of Data Center Kragujevac is measured as 2-3 on a scale of 0-5 while 0 means no risk whereas 5 means extremely high risk. Subsequently, the risk can be determined as moderate with an overall water risk of 2. Four of the risk types namely riverine flood risk, drought risk, untreated connected wastewater, and coastal eutrophication potential were assessed with a higher risk.

In addition, looking into the future the fact that water demand will increase paired with predictions of water supply decreasing could be troublesome. Especially, paired with the fact of seasonal variability and water stress increasing.

Although in some areas attention is required in the region of Kragujevac according to the Aqueduct Water Risk Atlas by WRI one could argue that A1 Data Center in Kragujevac has a very marginal water risk and the water consumption is very little. Yet, we are committed to tracking water data including the water data in Kragujevac on an annual basis. We are committed to revisiting the situation related to water risks on a regular basis and thereby ensuring that risks related to water use are mitigated in the best possible way. Also, we feel responsible for exploring risks related to water in other segments of the business.

5. Annex

Water Risk Atlas Tool description

Baseline

Physical Risks Quantity

*"Baseline **water stress** measures the ratio of total water withdrawals to available renewable surface and groundwater supplies. Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and nonconsumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate more competition among users.*

*Baseline **water depletion** measures the ratio of total water consumption to available renewable water supplies. Total water consumption includes domestic, industrial, irrigation, and livestock consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate larger impact on the local water supply and decreased water availability for downstream users. Baseline water depletion is similar to baseline water stress; however, instead of looking at total water withdrawal (consumptive plus nonconsumptive), baseline water depletion is calculated using consumptive withdrawal only.*

***Interannual variability** measures the average between-year variability of available water supply, including both renewable surface and groundwater supplies. Higher values indicate wider variations in available supply from year to year.*

***Seasonal variability** measures the average within-year variability of available water supply, including both renewable surface and groundwater supplies. Higher values indicate wider variations of available supply within a year.*

***Groundwater table decline** measures the average decline of the groundwater table as the average change for the period of study (1990–2014). The result is expressed in centimeters per year (cm/yr). Higher values indicate higher levels of unsustainable groundwater withdrawals.*

***Riverine flood risk** measures the percentage of population expected to be affected by Riverine flooding in an average year, accounting for existing flood-protection standards. Flood risk is assessed using hazard (inundation caused by river overflow), exposure (population in flood zone), and vulnerability.16 The existing level of flood protection is also incorporated into the risk calculation. It is important to note that this indicator represents flood risk not in terms of maximum possible impact but rather as average annual impact. The impacts from infrequent, extreme flood years are averaged with more common, less newsworthy flood years to produce the "expected annual affected population." Higher values indicate that a greater proportion of the population is expected to be impacted by Riverine floods on average.*

***Coastal flood risk** measures the percentage of the population expected to be affected by coastal flooding in an average year, accounting for existing flood protection standards. Flood risk is assessed using hazard (inundation caused by storm surge), exposure (population in flood zone), and vulnerability.17 The existing level of flood protection is also incorporated into the risk calculation. It is important to note that this indicator represents flood risk not in terms of maximum possible impact but rather as average annual impact. The impacts from infrequent, extreme flood years are averaged with more common, less newsworthy flood years to produce the "expected annual affected population." Higher values indicate that a greater proportion of the population is expected to be impacted by coastal floods on average.*

***Drought risk** measures where droughts are likely to occur, the population and assets exposed, and the vulnerability of the population and assets to adverse effects. Higher values indicate higher risk of drought.*

Physical Risks Quality

***Untreated connected wastewater** measures the percentage of domestic wastewater that is connected through a sewerage system and not treated to at least a primary treatment level. Wastewater discharge without adequate treatment could expose water bodies, the general public, and ecosystems to pollutants such as pathogens and nutrients. The indicator compounds two crucial elements of wastewater management: connection and treatment. Low connection rates reflect households' lack of access to public sewerage systems; the absence of at least primary treatment reflects a country's lack of capacity (infrastructure, institutional knowledge) to treat wastewater. Together these factors can indicate the level of a country's current capacity to manage its domestic wastewater through two main pathways: extremely low connection rates (below 1 percent), and high connection rates with little treatment. Higher values indicate higher percentages of point source wastewater discharged without treatment.*

***Coastal eutrophication potential** (CEP) measures the potential for riverine loadings of nitrogen (N), phosphorus (P), and silica (Si) to stimulate harmful algal blooms in coastal waters. The CEP indicator is a useful metric to map where anthropogenic activities produce enough point-source and nonpoint-source pollution to potentially degrade the environment. When N and P are discharged in excess over Si with respect to diatoms, a major type of algae, undesirable algal species often develop. The stimulation of algae leading to large blooms may in turn result in eutrophication and hypoxia (excessive biological growth and decomposition that reduces oxygen available to other organisms). It is therefore possible to assess the potential for coastal eutrophication from a river's N, P, and Si loading. Higher values indicate higher levels of excess nutrients with respect to silica, creating more favorable conditions for harmful algal growth and eutrophication in coastal waters downstream.*

Regulatory and Reputational Risk

Unimproved/no drinking water *reflects the percentage of the population collecting drinking water from an unprotected dug well or spring, or directly from a river, dam, lake, pond, stream, canal, or irrigation canal (WHO and UNICEF 2017). Specifically, the indicator aligns with the unimproved and surface water categories of the Joint Monitoring Programme (JMP)—the lowest tiers of drinking water services. Higher values indicate areas where people have less access to safe drinking water supplies.*

Unimproved/no sanitation *reflects the percentage of the population using pit latrines without a slab or platform, hanging/bucket latrines, or directly disposing human waste in fields, forests, bushes, open bodies of water, beaches, other open spaces, or with solid waste (WHO and UNICEF 2017). Specifically, the indicator aligns with JMP's unimproved and open defecation categories— the lowest tier of sanitation services. Higher values indicate areas where people have less access to improved sanitation services.*

The Peak RepRisk country ESG risk index *quantifies business conduct risk exposure related to environmental, social, and governance (ESG) issues in the corresponding country. The index provides insights into potential financial, reputational, and compliance risks, such as human rights violations and environmental destruction. RepRisk is a leading business intelligence provider that specializes in ESG and business conduct risk research for companies, projects, sectors, countries, ESG issues, NGOs, and more, by leveraging artificial intelligence and human analysis in 20 languages. WRI has elected to include the Peak RepRisk country ESG risk index in Aqueduct to reflect the broader regulatory and reputational risks that may threaten water quantity, quality, and access. While the underlying algorithm is proprietary, we believe that our inclusion of the Peak RepRisk country ESG risk index, normally unavailable to the public, is a value-add to the Aqueduct community. The peak value equals the highest level of the index in a given country over the last two years. The higher the value, the higher the risk exposure (WRI Aqueduct, 2019)."*

Future

"Water stress *is an indicator of competition for water resources and is defined informally as the ratio of demand for water by human society divided by available water.*

Seasonal variability (SV) *is an indicator of the variability between months of the year. Increasing SV may indicate wetter wet months and drier dry months, and higher likelihood of droughts or wet periods. We used the within-year coefficient of variance between monthly total blue water as our indicator of seasonal variability of water supply. We calculated the coefficient of variance between months for each year, then estimated projected change in seasonal variability as the 21-year mean around the target year over the baseline period mean.*

Total blue water (renewable surface water) was our indicator of ***water supply****. Projected change in total blue water is equal to the 21-year mean around the target year divided by the baseline period of 1950–2010.*

Water demand *was measured as water withdrawals. Projected change in water withdrawals is equal to the summarized withdrawals for the target year, divided by the baseline year, 2010. Since irrigation consumptive use varies based on climate, we generated unique estimates of consumptive and non-consumptive agricultural withdrawal for each year. Estimates for consumptive and non-consumptive agricultural withdrawal for each ensemble member, scenario, and target year are the mean of the 21-year window around the target year (WRI Aqueduct, 2019)."*