Water Risk Filter

## Country Overview - Slovenia

# Water Indicators

| Indicator | Value | Description | Source |
|---|---|---|---|
| Overall Basin Risk (score) | 2.16 | Overall Basin Risk (score) | |
| Overall Basin Risk (rank) | 174 | Overall Basin Risk (rank) | |
| Physical risk (score) | 2.12 | Physical risk (score) | |
| Physical risk (rank) | 154 | Physical risk (rank) | |
| Regulatory risk (score) | 2.04 | Regulatory risk (score) | |
| Regulatory risk (rank) | 153 | Regulatory risk (rank) | |
| Reputation risk (score) | 2.42 | Reputation risk (score) | |
| Reputation risk (rank) | 140 | Reputation risk (rank) | |
| 1. Quantity - Scarcity (score) | 1.34 | 1. Quantity - Scarcity (score) | |
| 1. Quantity - Scarcity (rank) | 183 | 1. Quantity - Scarcity (rank) | |
| 2. Quantity - Flooding (score) | 2.26 | 2. Quantity - Flooding (score) | |
| 2. Quantity - Flooding (rank) | 151 | 2. Quantity - Flooding (rank) | |
| 3. Quality (score) | 3.25 | 3. Quality (score) | |
| 3. Quality (rank) | 78 | 3. Quality (rank) | |
| 4. Ecosystem Service Status (score) | 3.31 | 4. Ecosystem Service Status (score) | |
| 4. Ecosystem Service Status (rank) | 27 | 4. Ecosystem Service Status (rank) | |
| 5. Enabling Environment (Policy & Laws) (score) | 2.45 | 5. Enabling Environment (Policy & Laws) (score) | |
| 5. Enabling Environment (Policy & Laws) (rank) | 116 | 5. Enabling Environment (Policy & Laws) (rank) | |
| 6. Institutions and Governance (score) | 2.00 | 6. Institutions and Governance (score) | |
| 6. Institutions and Governance (rank) | 169 | 6. Institutions and Governance (rank) | |
| 7. Management Instruments (score) | 2.15 | 7. Management Instruments (score) | |
| 7. Management Instruments (rank) | 143 | 7. Management Instruments (rank) | |
| 8 - Infrastructure & Finance (score) | 1.10 | 8 - Infrastructure & Finance (score) | |
| 8 - Infrastructure & Finance (rank) | 172 | 8 - Infrastructure & Finance (rank) | |
| 9. Cultural Diversity (score) | 1.00 | 9. Cultural importance (score) | |
| 9. Cultural Diversity (rank) | 186 | 9. Cultural importance (rank) | |
| 10. Biodiversity Importance (score) | 3.71 | 10. Biodiversity importance (score) | |

Water Risk Filter

## Country Overview - Slovenia

| Indicator | Value | Description | Source |
|---|---|---|---|
| 10. Biodiversity Importance (rank) | 73 | 10. Biodiversity importance (rank) | |
| 11. Media Scrutiny (score) | 2.55 | 11. Media Scrutiny (score) | |
| 11. Media Scrutiny (rank) | 146 | 11. Media Scrutiny (rank) | |
| 12. Conflict (score) | 2.52 | 12. Conflict (score) | |
| 12. Conflict (rank) | 92 | 12. Conflict (rank) | |
| 1.0 - Aridity (score) | 1.00 | The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment. | Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information. |
| 1.0 - Aridity (rank) | 179 | The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment. | Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information. |
| 1.1 - Water Depletion (score) | 1.00 | The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability. | Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4. |
| 1.1 - Water Depletion (rank) | 191 | The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability. | Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4. |
| 1.2 - Baseline Water Stress (score) | 1.51 | World Resources Institute’s Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users. | Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute. |

| Indicator | Value | Description | Source |
| --- | --- | --- | --- |
| 1.2 - Baseline Water Stress (rank) | 116 | World Resources Institute’s Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users. | Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute. |
| 1.3 - Blue Water Scarcity (score) | 1.00 | The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005. | Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323. |
| 1.3 - Blue Water Scarcity (rank) | 187 | The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005. | Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323. |
| 1.4 - Projected Change in Water Discharge (by ~2050) (score) | 2.04 | This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050. | Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250. |
| 1.4 - Projected Change in Water Discharge (by ~2050) (rank) | 79 | This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050. | Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 1.5 - Drought Frequency Probability (score) | 1.46 | This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration. | Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718. |
| 1.5 - Drought Frequency Probability (rank) | 174 | This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration. | Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718. |
| 1.6 - Projected Change in Drought Occurrence (by ~2050) (score) | 2.80 | This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios. | Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development. |
| 1.6 - Projected Change in Drought Occurrence (by ~2050) (rank) | 180 | This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios. | Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development. |
| 2.1 - Estimated Flood Occurrence (score) | 2.28 | This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source. | Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado. |
| 2.1 - Estimated Flood Occurrence (rank) | 151 | This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source. | Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado. |

| Indicator | Value | Description | Source |
| --- | --- | --- | --- |
| 2.2 - Projected Change in Flood Occurrence (by ~2050) (score) | 1.93 | This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios. | Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development. |
| 2.2 - Projected Change in Flood Occurrence (by ~2050) (rank) | 150 | This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios. | Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development. |
| 3.1 - Surface Water Contamination Index (score) | 3.25 | The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury).<br><br>The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen ( 12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%). | Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., ... & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 3.1 - Surface Water Contamination Index (rank) | 78 | The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury).<br><br>The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen ( 12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%). | Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., ... & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555. |
| 4.1 - Fragmentation Status of Rivers (score) | 3.53 | This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree. | Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., ... & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215. |
| 4.1 - Fragmentation Status of Rivers (rank) | 33 | This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree. | Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., ... & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215. |
| 4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (score) | 2.59 | For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control.<br>The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018. | Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tykavina, A., ... & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (rank) | 66 | For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control.<br>The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018. | Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tyukavina, A., ... & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853. |
| 4.3 - Projected Impacts on Freshwater Biodiversity (score) | 3.87 | The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity. | Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115. |
| 4.3 - Projected Impacts on Freshwater Biodiversity (rank) | 37 | The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity. | Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115. |
| 5.1 - Freshwater Policy Status (SDG 6.5.1) (score) | 3.00 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 5.1 - Freshwater Policy Status (SDG 6.5.1) (rank) | 99 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 5.2 - Freshwater Law Status (SDG 6.5.1) (score) | 2.00 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Law(s)" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.<br><br>For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 5.2 - Freshwater Law Status (SDG 6.5.1) (rank) | 140 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National Water Resources Law(s)” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.<br><br>For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (score) | 3.00 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.<br><br>For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (rank) | 117 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.<br><br>For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 6.1 - Corruption Perceptions Index (score) | 2.00 | This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector. | Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International. |
| 6.1 - Corruption Perceptions Index (rank) | 180 | This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector. | Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International. |
| 6.2 - Freedom in the World Index (score) | 1.00 | This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018. | Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House. |

| Indicator | Value | Description | Source |
| --- | --- | --- | --- |
| 6.2 - Freedom in the World Index (rank) | 180 | This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018. | Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House. |
| 6.3 - Business Participation in Water Management (SDG 6.5.1) (score) | 3.00 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Business Participation in Water Resources Development, Management and Use” indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 6.3 - Business Participation in Water Management (SDG 6.5.1) (rank) | 105 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Business Participation in Water Resources Development, Management and Use” indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 7.1 - Management Instruments for Water Management (SDG 6.5.1) (score) | 2.00 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Sustainable and efficient water use management” indicator, which corresponds to one of the five national level indicators under the Management Instruments category.<br><br>For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 7.1 - Management Instruments for Water Management (SDG 6.5.1) (rank) | 151 | This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Sustainable and efficient water use management” indicator, which corresponds to one of the five national level indicators under the Management Instruments category.<br><br>For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 7.2 - Groundwater Monitoring Data Availability and Management (score) | 3.00 | This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data. | UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC). |
| 7.2 - Groundwater Monitoring Data Availability and Management (rank) | 134 | This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data. | UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC). |
| 7.3 - Density of Runoff Monitoring Stations (score) | 2.00 | The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018). | BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG). |
| 7.3 - Density of Runoff Monitoring Stations (rank) | 188 | The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018). | BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG). |
| 8.1 - Access to Safe Drinking Water (score) | 1.00 | This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017. | WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. |
| 8.1 - Access to Safe Drinking Water (rank) | 178 | This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017. | WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. |
| 8.2 - Access to Sanitation (score) | 1.00 | This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017. | WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 8.2 - Access to Sanitation (rank) | 184 | This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017. | WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. |
| 8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (score) | 2.00 | This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (rank) | 167 | This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources. | UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation. |
| 9.1 - Cultural Diversity (score) | 1.00 | Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture.<br>This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity. | Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International. |
| 9.1 - Cultural Diversity (rank) | 186 | Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture.<br>This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity. | Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International. |
| 10.1 - Freshwater Endemism (score) | 4.18 | The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks. | WWF & TNC (2015). Freshwater Ecoregions of the World. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| 10.1 - Freshwater Endemism (rank) | 63 | The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks. | WWF & TNC (2015). Freshwater Ecoregions of the World. |
| 10.2 - Freshwater Biodiversity Richness (score) | 3.24 | The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks. | WWF & TNC (2015). Freshwater Ecoregions of the World. |
| 10.2 - Freshwater Biodiversity Richness (rank) | 89 | The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks. | WWF & TNC (2015). Freshwater Ecoregions of the World. |
| 11.1 - National Media Coverage (score) | 3.00 | This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter). | WWF & Tecnoma (TYPSA Group) |
| 11.1 - National Media Coverage (rank) | 172 | This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter). | WWF & Tecnoma (TYPSA Group) |
| 11.2 - Global Media Coverage (score) | 2.00 | This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account. | WWF & Tecnoma (TYPSA Group) |
| 11.2 - Global Media Coverage (rank) | 146 | This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account. | WWF & Tecnoma (TYPSA Group) |

# Country Overview - Slovenia

| Indicator | Value | Description | Source |
|---|---|---|---|
| 12.1 - Conflict News Events (RepRisk) (score) | 3.00 | This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company’s reputational risk. These negative news events are labelled per country and industry class. | RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk. |
| 12.1 - Conflict News Events (RepRisk) (rank) | 105 | This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company’s reputational risk. These negative news events are labelled per country and industry class. | RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk. |
| 12.2 - Hydro-political Risk (score) | 2.03 | This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues. | Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313. |
| 12.2 - Hydro-political Risk (rank) | 122 | This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues. | Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313. |
| Population, total (#) | 2064845 | Population, total | The World Bank 2018, Data , hompage accessed 20/04/2018 |
| GDP (current US$) | 44708598649 | GDP (current US$) | The World Bank 2018, Data , hompage accessed 20/04/2018 |
| EPI 2018 score (0-100) | 67.57 | Environmental Performance Index | |
| WGI -Voice and Accountability (0-100) | 83.81 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |

## Country Overview - Slovenia

| Indicator | Value | Description | Source |
|---|---|---|---|
| WGI -Political stability no violence (0-100) | 77.34 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |
| WGI - Government Effectiveness (0-100) | 83.65 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |
| WGI - Regulatory Quality (0-100) | 73.08 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |
| WGI - Rule of Law (0-100) | 82.69 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |
| WGI - Control of Corruption (0-100) | 77.40 | Water Governance Indicator | Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132 |

## Country Overview - Slovenia

| Indicator | Value | Description | Source |
| --- | --- | --- | --- |
| WRI BWS all industries (0-5) | 0.03 | WRI Baseline Water Stress (BWS) | Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings. |
| WRI BWS Ranking (1=very high) | 167 | WRI Baseline Water Stress (BWS) | Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings. |
| Baseline Water Stress (BWS) - 2020 BAU (1=very high) | 127 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2020 Optimistic (increasing rank describes lower risk) | 129 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2020 Pessimistic (increasing rank describes lower risk) | 128 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |

| Indicator | Value | Description | Source |
|---|---|---|---|
| Baseline Water Stress (BWS) - 2030 BAU (increasing rank describes lower risk) | 119 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2030 Optimistic (increasing rank describes lower risk) | 119 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2030 Pessimistic (increasing rank describes lower risk) | 120 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2040 BAU (increasing rank describes lower risk) | 116 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2040 Optimistic (increasing rank describes lower risk) | 116 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |
| Baseline Water Stress (BWS) - 2040 Pessimistic (increasing rank describes lower risk) | 117 | WRI country ranking | Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings. |

## Country Overview - Slovenia

| Indicator | Value | Description | Source |
|---|---|---|---|
| Total water footprint of national consumption (m3/a/cap) | 2012.37 | WFN Water Footprint Data | Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf |
| Ratio external / total water footprint (%) | 62.95 | WFN Water Footprint Data | Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf |
| Area equipped for full control irrigation: total (1000 ha) | 7.60 | Aquastat - Irrigation | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Area equipped for irrigation: total (1000 ha) | 7.60 | Aquastat - Irrigation | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| % of the area equipped for irrigation actually irrigated (%) | 0.00 | Aquastat - Irrigation | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Electricity production from hydroelectric sources (% of total) | 25.71 | World Development Indicators | The World Bank 2018, Data , hompage accessed 20/04/2018 |
| Total internal renewable water resources (IRWR) (10^9 m3/year) | 18.67 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Total internal renewable water resources (IRWR) (10^9 m3/year) | 13.20 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Water resources: total external renewable (10^9 m3/year) | 18.67 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |

# Water Risk Filter

## Country Overview - Slovenia

| Indicator | Value | Description | Source |
|---|---|---|---|
| Total renewable water resources (10^9 m3/year) | 31.87 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Dependency ratio (%) | 41.42 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| Total renewable water resources per capita (m3/inhab/year) | 15411.00 | Aquastat - Water Ressources | FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13 |
| World happiness [0-8] | 5.95 | WorldHappinessReport.org | World Happiness Report, homepage accessed 20/04/2018 |

# Country Aspects

## 1. PHYSICAL ASPECTS

### 1.1. WATER RESOURCES

#### 1.1.1. WATER RESOURCES

Slovenia ranks among the better-watered and largely spring-fed countries, with a dense river network, a rich aquifer system, and significant karstic underground watercourses. Slovenia has a moderately warm climate. However, in line with its geographical diversity, conditions vary. Meeting above Slovenian territory are the influences of the Mediterranean climate, which is characteristic of the coastal part of Slovenia; the continental climate typical of the central part of Slovenia and the Pannonian region to the east and the Alpine climate in the northwest of the country.

The level of precipitation is sufficient across most of Slovenia, and does not vary seasonally. It is highest in the Alpine area to the west, with more than 3,000mm/yr, and this declines to the east, where it is lowest, amounting to around 800mm/yr. Along the Adriatic coast the precipitation level is lower than the average and lower in summer than in winter. In winter it is normal for snow to cover all continental regions, and in the Alps – given the high amounts of precipitation – the snow cover can reach up to 9m (Kanin ski resort in 2009). In the summer, especially in June, July and August, the greater part of Slovenia typically experiences a large number of storms, around 50 each year – the highest amount in Europe.

It has a long-term average annual precipitation of 1,162mm/yr. The long-term average of annual renewable water resources is 31,870 million m3/yr of which 59 per cent of them are considered as internal water resources, and (18.670 million m3) and 41 per cent are considered as external water resources (13,200 million m3).

Analyses of the hydrological state in Slovenia indicate that the available quantities of water are diminishing and that the distribution of precipitation is changing in terms of time and space. Greater regional difficulties are anticipated due to the following effects of climate change: greater frequency and strength of hydrological, meteorological and geomorphological natural threats, droughts, heat waves, storms, high winds, frosts, hail and fires in the natural environment due to temperature extremes, a change in precipitation and flow regimes and a deterioration in the ecological and chemical quality of water.

The anticipated climate change is contributing to the reduced availability of water and also to the more frequent and longer-lasting spring and summer droughts. In Slovenia drought accounted for more than 80 per cent of the damage from natural disasters in 2003, 70 per cent in 2000 and 60 per cent in 2001. Agricultural drought was also encountered in 2006 and 2007. Owing to climate change – rising temperatures and increased evapotranspiration, less and more imbalanced precipitation in terms of timing and location, increased frequency and intensity of extraordinary weather phenomena, etc. – there will be a heightened role for Slovenian agriculture and forestry in ensuring environmental and ecosystem services.

Farm and forest management must also play a major part in efficient water use in drought-prone areas, in the protection of watercourses from excessive emissions of nutrients, in support for creating the conditions to ensure clean drinking water, in improving the control of floods and other natural disasters, in preserving and increasing the numerous functions of the forests, and in maintaining and renewing multi-purpose landscapes. The construction of dams and irrigation systems ranks among the most important objectives of agricultural policy. This also includes long-term planning and construction of irrigation systems with the adequate provision of new water sources and the prudent conservation of existing ones. Climate change projections indicate that without any adaptation, it will be impossible to maintain farming in the most vulnerable areas, while yields and competitiveness will be reduced in other areas.

On average there are sufficient quantities of water in Slovenia and most of it is in a good ecological state. There is a noticeable impact of agriculture on water quality, especially in eastern parts of the country, which are dryer. There is also a concern about the decreasing of groundwater level in certain areas. Estimates of the quantity of groundwater bodies provided by the hydrogeological service of the Slovenian Environment Agency (ARSO), point to a relatively good situation, although concern has risen in recent years over the lowering surface level of certain parts of groundwater bodies. In the future, because of possible unfavourable developments owing to climate change, this phenomenon will be closely monitored.

Nevertheless, since 1992, a total of seven summer droughts have hit agriculture. The drought accounted for 80 per cent of the total damage incurred from natural disasters in 2003. At least 15 per cent of the country's surface area is threatened by a lack of water in the soil in summer months, most of all the Primorska region and northeast Slovenia. In observing climate change there has been a noticeable shift towards a serious lack of water in the interior of the country, too.

The summer of 2003 saw the consequences of the uneven distribution of water resources in Slovenia, and in places also the weakness of the supply of drinking water, with 47,396 people – 2.4 per cent of the population – needing to be supplied with water brought in by tankers. Despite reserves in the Alps, the most favourable scenarios indicate that water shortages may be expected in the north-eastern parts of the country.

Floods threaten more than 3,000km2 or just fewer than 15 per cent of the country's surface area. As much as half the flood zone is in the Sava basin, 40 per cent in the Drava basin and 4 per cent in the Soča basin. There is a threat primarily to flash-flood ravines, valley floors and, in many places, built-up alluvial plains. There is less extensive flooding from coastal tides and karstic flooding. In part of the flood areas grassland and pasture have been converted to cultivated land, and in some places flood areas have also been built on. In 1991 the area of usual flooding was home to 7 per cent of the population, a quarter of whom live in areas affected by major floods.

A rise in the sea level of 1mm a year has been recorded. Between 1960 and 2006, on 306 occasions, the sea level reached the flood point of 3m above normal. Frequent sea flooding occurs mainly in the autumn and winter, and occasionally in spring, with the frequency increasing. The flood area is most extensive in the municipality of Piran, and in times of exceptional flooding, 2.5 per cent of the total population are threatened in coastal municipalities.

In close relation with the above mentioned, the most important preserved wetlands in Slovenia are flood meadows and wet grassland, which humans have created in part and help to preserve through extensive farming. They cover around 200,000m3. In order to promote more intensive agriculture, drainage, regulation of watercourses and reinforcing of banks have destroyed wetlands in the central courses of rivers. Examples of this include instances in Pomurje and the Vipava valley, and along the coast through the construction of transport infrastructure and urbanisation.

Slovenia has two river basin districts (RBDs), one of which is an internationally shared watercourse area, with Austria to the north and Hungary to the east. The RBDs are the Adriatic RBD and the Danube RBD. The Slovenian River Basin Management Plans (RBMPs), for both RBDs, and containing the plans in question as well as of the Programme of Measures, have been in place since 28 July 2011. They were published in the official journal of Slovenia (OJ RS no. 61/2011) a day later and entered into force on 13 August 2011. The documents can be found on the Ministry of the Environment and Spatial planning website.

## 1.1.2. WATER USE

The anticipated climate change is expected to contribute to the reduced availability of water due, to increased use in agriculture and the energy sector. Data on water abstraction in Slovenia has been reliable since 2002, when the Waters Act laid down the acquisition of water rights for any special use of water. In 2008 around 40,400 legal entities and individuals had acquired rights for special use of water.

The main water consumer is hydroelectric power generation, followed by one of the non-hydroelectric power generation sectors (electricity generation in thermal power stations). Other uses – irrigation, snowmaking, beverage production, etc. – represent a small proportion of consumption, but they are growing. Statistics on the quantity of water pumped into the mains water system for use in households and manufacturing indicate a reduction in the last decade, primarily due to more efficient use of water in industry – thanks to the impact of taxes payable for burdening water – and farming. Household consumption of water has not changed significantly.

Water withdrawal in the country in 2009 was estimated in a total of 942 million m3. Around 80 per cent of the total resources abstracted come from surface water bodies, and around 20 per cent come from groundwater bodies.

This water abstraction can be itemized by user sector. In 2009, it was estimated that the water dedicated to agriculture only reached the mark of 2 million m3. For Urban purposes the water abstraction was stated as 165 million m3, and for industrial uses the value was stated as much as 775 million m3 (more than 80 per cent of the total demand).

## 1.2. WATER QUALITY, ECOSYSTEMS AND HUMAN HEALTH

Water quality is especially impacted by agriculture, so great attention is paid to agri-environmental measures. Water is a public good administered by the state. The state strives, as far as it can, to achieve the goals of environmental policy, these being to ensure the sustainable exploitation of the country's aquatic wealth and to improve the state of its ecology where it is still not good, and conserving it where it is. In recent years numerous municipal treatment facilities have been constructed, and some are still being built. More than half the population's wastewater is treated in municipal or communal facilities.

Karstic water merits special concern, owing to its vulnerability and meagre capacity for self-purification. Since such water supposedly accounts for almost half Slovenia's reserves of groundwater, its protection is especially important. Caution is desirable across the entire area of the karst, since many routes of underground watercourses remain unexplored. However, the majority of Slovenian water bodies meet international goals for water quality. There are programmes for improving and maintain water quality in implementation and the revisions in preparation.

The Slovenian Environment Agency started implementing the monitoring programme under the Water Framework Directive (WFD, Directive 2000/60) in 2007. Of 121 surface water bodies in the Danube drainage area, 100 were classified, with 44 not matching the objectives; 2 of 44 classified as very poor, 6 as poor and 36 as of moderate quality. The remaining 56 water bodies achieve the environmental objectives, with 49 being classified as good and 7 as being of very good environmental quality. Of 34 water bodies in the Adriatic drainage area, 28 surface water bodies were classified. Of these, five do not achieve the objectives set out in the WFD; one of five is classified as poor and four as of moderate quality. The remaining 23 water bodies achieve the environmental objectives, with 19 being classified as good and 4 as being of very good environmental quality (based on the information stated of the RBMPs). Slovenia's objective is to achieve overall good water quality by 2020 at the latest.

The three biggest natural lakes have been assessed. Account has been taken of the biological elements of quality, general physical and chemical parameters and special contaminants, but not of fish, since as in the case of rivers, an evaluation methodology has not yet been formulated. Lake Bohinj has been classified as being in very good ecological condition, and Lake Cerknica as good. The reason for the moderate quality of Lake Bled is the excessive burden of nutrients.

Eutrophication, especially the accumulation of phosphorus in water, is a problem for Lake Bled. Increasing the concentration of nutrients accelerates the growth of phytoplankton, which contribute to reduced translucency. At Lake Bled an improvement in quality, mainly the result of measures taken, has been observed. The average concentration of phosphorus, however, is much higher in artificial retention lakes in central and northeast Slovenia that lie in areas of intensive farming.

Point sources of water pollution cause problems chiefly during periods of low flow of watercourses and when legally established emission values are exceeded. However, it is harder to exercise control over diffuse sources of emissions into surface and groundwater. There are difficulties in removing wastewater from settlements where sewers and treatment facilities are not yet properly in place, and these are compounded by nutrients from plant protection agents used in agriculture. In the Danube drainage area the calculated total annual emissions in 2003/2004 amounted to 6,339t/yr of nitrogen and 27t/yr of phosphorus, while in the Adriatic drainage area in the same period annual emissions were 641t/yr of nitrogen and 3t/yr of phosphorus.

Slovenian rivers are fast-flowing, so they possess good oxygen conditions and few nutrients. The concentration of nitrates is slightly above the natural background, estimated at 1mg N/L (4.4mg NO3/L). Average concentrations are lower than 10mg NO3/L, with higher amounts apparent in northeast Slovenia, although for the most part they do not exceed 40mg. No major seasonal variations have been observed.

The water bodies most affected by human activity are in the northeast of Slovenia. A three year data series indicates, with a high level of reliability, the poor chemical condition of the Savinja, Drava and Mura basins, and, with a low level of reliability, the eastern Slovenske gorice area. Of pesticides, the concentrations of atrazine are most commonly exceeded, although concentrations in groundwater are falling. Generally speaking, the rivers and lakes are not burdened with hazardous substances. The assessment of the chemical condition for 2006-2008 indicates that only two bodies of inland water did not achieve good quality, owing to excessive concentrations of mercury and tributyltin compounds, respectively.

The proportion of the population, whose wastewater is treated in municipal or communal treatment facilities, rose from barely a fifth in 1998 to almost half in 2007. 65 per cent of a total of 111 million $m^3$ of treated wastewater attained a secondary level of treatment in these facilities in 2007. Even though, compared to other European countries, the proportion of inhabitants connected to the wastewater drainage system is low, this is largely a consequence of the scattered settlement of Slovenia. The Operational Programme for Removal and Treatment of Wastewater for 2005-2017 envisages the construction of a system of public sewage and municipal water treatment plants. By end 2017 more than 1.5 million, or 75 per cent, of Slovenia's inhabitants will be connected to the public sewer system.

The operational programme for drinking water supply up to 2013 sets the objective of ensuring safe drinking water supply for everyone. In the event of microbiological pollution there is a need to adhere consistently to the principles of multiple barriers and to carry out the preparation of drinking water where necessary. In the event of chemical contamination – pesticides, and nitrates – measures need to be taken in water protection areas. Polluted small systems needs to be corrected or closed down and residents connected to medium and large-scale systems.

# 2. GOVERNANCE ASPECTS

## 2.1. WATER INSTITUTIONS

The drafting of strategic documents and legislation to ensure a healthy living environment and sustainable development is a task assigned to the Ministry of the Environment and Spatial Planning. Their implementation, including the issuing of permits and monitoring of the state of the environment, is the task of the Environmental Agency of the Republic of Slovenia (ARSO). A supervisory role is also played by another body attached to the ministry, the national Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning.

Ensuring the drinking water supply, treatment of municipal wastewater and the managing of municipal waste and some natural resources of local importance, including spatial planning, fall within the jurisdiction of local communities, which consist of 210 municipalities.

## 2.2. WATER MANAGEMENT

The sustainable provision of water and adaptation to climate change will be governed by the Water Management Plan. Setting the prices of services in this area has a major effect in terms of increasing the sustainability of water resources. An important element of ensuring safe drinking water is water protection measures, first and foremost good monitoring of quality, and then a range of operational programmes.

Regarding water pricing, there is a need to take into account the principle of recovering the costs associated with burdening water which has been laid down in Article 3 of the Waters Act. Article 9 of the Water Framework Directive states that Member States must take account of the principle of recovery of the costs of water services, including environmental and resource costs, in accordance with the polluter pays principle. The principle of recovery of costs for drinking water supply services and for the removal and treatment of municipal wastewater and rainwater has not yet been fully implemented.

The National Environmental Protection Programme (NEPP) envisages, as a priority for achieving its aims in terms of financing, the fairly fundamental principle of the polluter pays. The NEPP therefore defines economic instruments – taxes, subsidies, environmental accounting, internalisation of costs, etc. – and such environmental contributions as a basic source of funds in the system of financing environmental protection. Currently Slovenia only has wastewater contributions, which are collected by municipalities.

Reducing water losses from main water systems is also a priority. In fact, despite marked reductions in the recent past year theses losses are still around 26 per cent. The Operational Programme for Drinking Water Supply envisages the investment of €50 million in measures on the municipal and regional levels.

Finally, the National Strategic Plan for Drought Management and Water Use envisages the drawing up of a plan of urgent measures to cope with droughts – priority water use – and amendments to the laws governing water and agricultural land, through the introduction of regulations for the proper use of water in farming and determining appropriate priority areas during water shortages. Simplifying the process of issuing of water permits and acquiring documents to construct small accumulation ponds in the direct vicinity of cultivated farmland as well as for boreholes and wells is envisaged.

## 2.3. WATER POLICY AND LEGAL FRAMEWORK

The main Directives and related legislation at European level, regarding the domain of water resources management are:
•Directive 80/68/EEC of 17 December, 1979 on the protection of groundwater against pollution caused by certain dangerous substances;
•Directive 82/176/EEC of 22 March, 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry; covers inland surface water, territorial waters and internal coastal waters;
•Directive 83/513/EEC of 26 September, 1983 on limit values and quality objectives for cadmium discharges; sets limit values and quality objectives for cadmium discharges in the aquatic environment;
•Directive 84/156/EEC of 8 March, 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry; sets limit values and quality objectives for mercury discharges in sectors other than the chlor-alkali electrolysis industry;
•Directive 84/491/EEC of 9 October, 1984 on limit values and quality objectives for discharges of hexachlorocyclohexane;
•Directive 91/271/EEC of 21 May, 1991 concerning urban waste water treatment;
•Directive 91/676/EEC of 12 December, 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (known as the Nitrates Directive);
•Directive 98/83/EC of 3 November, 1998 on the quality of water;
•Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy;
•Regulation (EC) No 648/2004 of the European Parliament and of the Council of 31 March, 2004 on detergents;
•Decision 2006/507/EC of 14 October, 2004 concerning the conclusion, on behalf of the European Community, of the Stockholm Convention on Persistent Organic Pollutants (POPs);
•Directive 2006/7/EC of the European Parliament and of the Council of 15 February, 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC (with effect from 31 December, 2014);
•Directive 2006/44/EC of 6 September, 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (this Directive will be repealed by the Framework Directive on water as of the end of 2013);
•Directive 2006/11/EC of the European Parliament and of the Council of 15 February, 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community the European Union (this Directive will be repealed by the Framework Directive on water as of the end of 2013);
•Proposal for a European Parliament and Council Directive of 22 September, 2006 setting out a framework for soil protection and amending Council Directive 2004/35/EC [COM (2006) 231 final – not published in the Official Journal];
•Directive 2006/118/EC of the European Parliament and of the Council of 12 December, 2006 on the protection of groundwater against pollution and deterioration;
•Directive 2007/2/EC of the European Parliament and of the Council of 14 March, 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE);
•Commission Communication of 18 July, 2007: "Addressing the challenge of water scarcity and droughts in the European Union" [COM (2007) 414 final – not published in the Official Journal];
•Directive 2007/60/EC of the European Parliament and of the Council of 23 October, 2007 on the assessment and management of flood risks; aims to manage and reduce the risk of floods, particularly along rivers and in coastal areas;
•Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (the IPPC Directive);
•Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
As a member state of the European Union, Slovenia has to implement this legislation in its own legal framework, defining specific laws for the implementation of the different directives and the common legislative principles. This is a responsibility of the Ministry of the Environment and Spatial Planning, and their implementation, including the issuing of permits and monitoring of the state of the environment, is the task of ARSO.

## 3. GEOPOLITICAL ASPECTS

Slovenia's terrain diversity is exceptional, with four major natural units merging in this small part of Central Europe: the Alps, Dinaric Alps, Pannonian Basin and the Mediterranean. The north of Slovenia lies in the Alps. The limestone and Dolomite Mountains of the high Alps are separated by deep, glacially-formed valleys, and are largely uninhabited. To the south and east they continue into somewhat lower, but similarly separated Alpine foothills, overgrown with forest and scattered with isolated farms and villages. The gravelly bottoms of the Alpine valleys are extremely abundant, yet, owing to dense settlement, intensive farming, large-scale transport and numerous other factors, have very vulnerable watercourses.
Slovenia is a parliamentary democratic republic that became an independent state after the disintegration of Yugoslavia in 1991, and joined the European Union in May 2004. Since independence in 1991, Slovenia's economic development has been successful, making it one of the most thriving countries in transition. On 1 January 2007, Slovenia became the first new EU member to adopt the Euro, and in the first half of 2008 successfully held the Presidency of the Council of the European Union.
Slovenia's surface area measures 20,273 km2 and covers part of the sea in addition to its land territory. It is home to just over 2 million people in a little under 6,000 settlements. Half live in small settlements with fewer than 2,000 residents, and Ljubljana, with 276,000, and Maribor, with 113,000, are the only cities with more than 100,000 inhabitants. Average population density is 99 people per km2, but the great topographical variation means there is uneven settlement, with the concentrations in the lowland areas of Alpine valleys, the Pannonian Plain and the coastal area – and this is increasing.
From the end of World War II until independence in 1991, Slovenia was the most developed of the

six republics of the Socialist Federal Republic of Yugoslavia. Aspirations for more balanced development of economic sectors and thereby smoother involvement in international trade, better provision for the population and greater prosperity appeared as early as the 1950s. Development was geared towards manufacturing and high-technology industry, such as chemicals. In the period since 1995, the economy has grown by an average of 4 per cent a year, closing Slovenia's development gap with the EU average. In 2008, gross domestic product (GDP) per person in terms of purchasing power parity (ppp) reached 92 per cent of the EU average. While the economy grew, unemployment fell – and in 2008 registered unemployment stood at 6.7 per cent. The Slovenian economy has a high industrial component in total generated value added, and within this there is a high proportion of energy-intensive activities and a low proportion of high-tech ones.

Regional spatial planning was implemented as part of social planning, with towns expanding primarily around industrial centres, and in the 1960s the main trends of settlement followed this path. In the 1970s, however, people started moving back to rural areas close to the towns. The prospects of employment in industry also changed the proportion of the farming population, which fell from 49 per cent in 1948 to 12.5 per cent in 1981. Owing to the major energy potential of rivers, even in the 1950s the management of water by river basins was in place.

More than half of Slovenia's land surface is covered with forest, other mainly natural growth, including natural grassland, wetlands, aquatic and slightly or non-overgrown surfaces, which cover 4 per cent, 35 per cent of which is mainly used for farming, while just under 3 per cent is comprised of artificial surfaces. Data from the more detailed land use database (Ministry of Agriculture, Forestry and Food of the Republic of Slovenia) indicate that between 2002 and 2007 the total extent of cultivated fields and gardens declined by 15.4 per cent, hop gardens by 16.3 per cent, land left fallow by 12.9 per cent, vineyards by 12.4 per cent and other uses by 20 per cent. The total extent of forests in this period increased by 1.5 per cent, olive groves by 41.7 per cent, grasslands by 6.9 per cent and extensive orchards by 2.2 per cent.

In 2007, electricity from the big hydroelectric stations, amounting to >10MW, accounted for 19 per cent of electricity generated; 84.6 per cent of this electricity is produced from renewable energy sources. This is followed by small-scale hydroelectric stations with 3 per cent and 12 per cent respectively. The estimated economic exploitation potential amounts to between 7,000 and 8,500GWh a year, and in 2007 generation amounted to 3,265GWh. From 2000 to 2007 the actual capacity of hydroelectric stations increased by 18.4 per cent, as a result of refurbishing, and was supplemented in 2007 by new, small hydroelectric stations, whose total combined generation was 409GWh in 2007. Further exploitation of water potential for generating electricity is problematic primarily in terms of preserving the vulnerable natural environment. There is discussion of exploiting the hydroelectric potential of the River Mura.

## 4. SOURCES

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