



# Climate Change

## Impact on Environment and Society

### Water Supply and Sanitation

# The Impact of Climate Change on the Austrian Water Supply and Sanitation Sector

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The interdisciplinary COIN project evaluates the economic impact of climate change on the Austrian water supply and sanitation sector.

#### Main findings

- Under the assumption of a moderate climate change and a medium socio-economic scenario, climate change will cause additional average costs over the coming decades. Those are estimated to accumulate to the amount of at least € 57 million (mn) (€ 170 mn) for the 2011–2030 (2031–2050) period.
- In an overall economic context, the expected climate-related costs will lead to an increase in the water supply and sanitation sector's gross value added, as higher investments will be necessary. However, since prices will increase accordingly, the consumption expenditure of private households will decrease, and thus negative overall welfare effects<sup>1</sup> are to be expected.
- In addition to costs directly related to climate change, high investment expenditures due to socio-economic developments are expected for the sector. They are estimated at an accumulated € 1.6 billion for the 2031–2050 period.
- Due to lack of available data and given uncertainties, the current results rather represent an initial estimate of minimum values, since it was well beyond the scope of the study to evaluate all possible costfactors.

The climate and its variability strongly influence the Austrian water supply and sanitation sector. While decreasing precipitation sums and increasing temperatures reduce the availability of spring and ground water – which could affect the safe and secure drinking water supply – extreme weather events (floods, mudslides, etc.) cause considerable damage to the entire sector's infrastructure. The flood of 2002, e.g., caused reported damages of € 10 mn to the Austrian water supply network throughout the regions concerned (Perfler et al. 2007).

The interdisciplinary COIN (Cost of Inaction – Assessing Costs of Climate Change for Austria) project evaluates economic impacts of climate change in Austria. For this purpose, a scenario-based analysis of and across twelve key sectors is conducted, which assesses the possible impact of climatic change in combination with socio-economic developments. The main scenario assumes a temperature rise within the two degrees Celsius margin for the period up to 2050. This assumption presupposes stronger climate policies than the ones currently in place. The analyses presented here only show that part of all potential impacts which has already been quantified and takes into consideration individual adjustments made.

#### Project info box

#### What has been analysed?

The current study has investigated the impact of changing temperature and precipitation conditions on the Austrian water supply and sanitation sector. In doing so, the study takes into consideration the impact on the sector's capital expenditure (e.g., infrastructure expansion due to compromised resources), on replacement costs (e.g., for weather-related damages to the infrastructure) and on costs owing to changing demands (e.g., for water as a result of rising temperatures). Due to insufficient availability and reliability of data – especially concerning regional developments in the spatial distribution of precipitation – several impacts could not be taken into account by the current study. Therefore, e.g. changing demands attributable to differently distributed precipitation, a reduced performance of the sanitation system due to floods, or temperature-related microbiological deterioration of resources could not be evaluated.

<sup>1</sup> The COIN project assesses social costs of climate change in terms of welfare effects, which represent the changes in the amount of goods and services consumed. Other welfare-generating effects, such as changes in environmental quality, have not been quantified.

## What impacts are to be expected?

For the area of drinking water supply, the results obtained under a moderate climate change scenario<sup>2</sup> and medium socio-economic developments<sup>3</sup> show that additional climate-related accumulated costs of at least € 29 mn will occur until 2030. Over the 2031–2050 period, the additional costs will rise to an accumulated amount of € 87 mn. For the area of sanitation, the results are similar, showing accumulated additional costs of € 28 mn (€ 83 mn) over the period up to 2030 (2050). However, compared to the general costs expected to arise for the sector due to socio-economic developments, the climate change-related costs quantified thus far are rather low. The socio-economic developments assumed for the 2031–2050 period will increase the sector's future capital expenditure by an accumulated amount of approx. € 1.6 billion compared to the reference period of 1990–2010.

## Do alternative projections for the future change the results?

In addition to directly climate-related impacts, the study also takes into consideration different possible developments in future population size. Such changed socio-economic conditions can affect the sector's sensitivity to climate change and may thus influence the respective economic impact.

Table 1: Accumulated climate change-related economic impact on sanitation and water supply based on climatic and socio-economic developments (in million €).

Economic Impact* 2030–2050	Climate change		
	moderate		
Sanitation	Socio-economic development (sensitivity**)	low	-85
		medium	-87
		high	-98
Water supply	Socio-economic development (sensitivity**)	low	-81
		medium	-83
		high	-93

\* Future economic impact: negative numbers indicate net losses, positive numbers indicate net gains.

\*\*Result sensitivity with respect to socio-economic development parameters.

<sup>2</sup> The moderate climate change scenario assumes a mean temperature rise of +1.0° C (+2.0° C), annual changes in precipitation sums of +1.4 % (-2.3 %), and a change in the number of days with precipitation of +2.1 % (3.5 %), comparing the reference period (1981–2010) to the first (second) scenario period 2016–2045 (2036–2065).

<sup>3</sup> For the year 2050, the study assumes a population of 9.3 million in Austria.

<sup>4</sup> The result is based on comparing the individual climate scenarios to a baseline scenario (which interprets socio-economic developments with no climate change at a medium sensitivity level of the traffic sector).

As Table 1 shows, alternative assumptions as to demographic growth do not affect the resulting costs to any considerable extent. Thus, assuming strong demographic growth, the sector's climate change costs would increase from € 170 mn to € 191 mn by 2050. Mild demographic growth would, by contrast, lead to a cost decrease of € 4 mn. However, due to lack of available data and given uncertainties, the current results rather represent an initial estimate and indicate minimum values.

## What impacts on the Austrian national economy can be expected?

The current results do not yet consider the water supply and sanitation sector's interrelation with other sectors. When taking those interdependencies into account, the findings obtained under a moderate climate change scenario and medium socio-economic developments show an annual welfare decrease<sup>4</sup> of € 2 mn (€ 5 mn) by 2030 (for the 2030–2050 period respectively). This effect can be traced back to an increase in necessary investments which, on the one hand, will also increase the water supply and sanitation sector's annual gross value added, but which, on the other hand, will have a negative welfare effect, as increasing water prices will reduce the consumption expenditure for other goods and commodities (e.g., in the areas of retail, trade or real estate).

## References

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