SHURA Energy Transition Center

SHURASTAT
Energy transition in numbers

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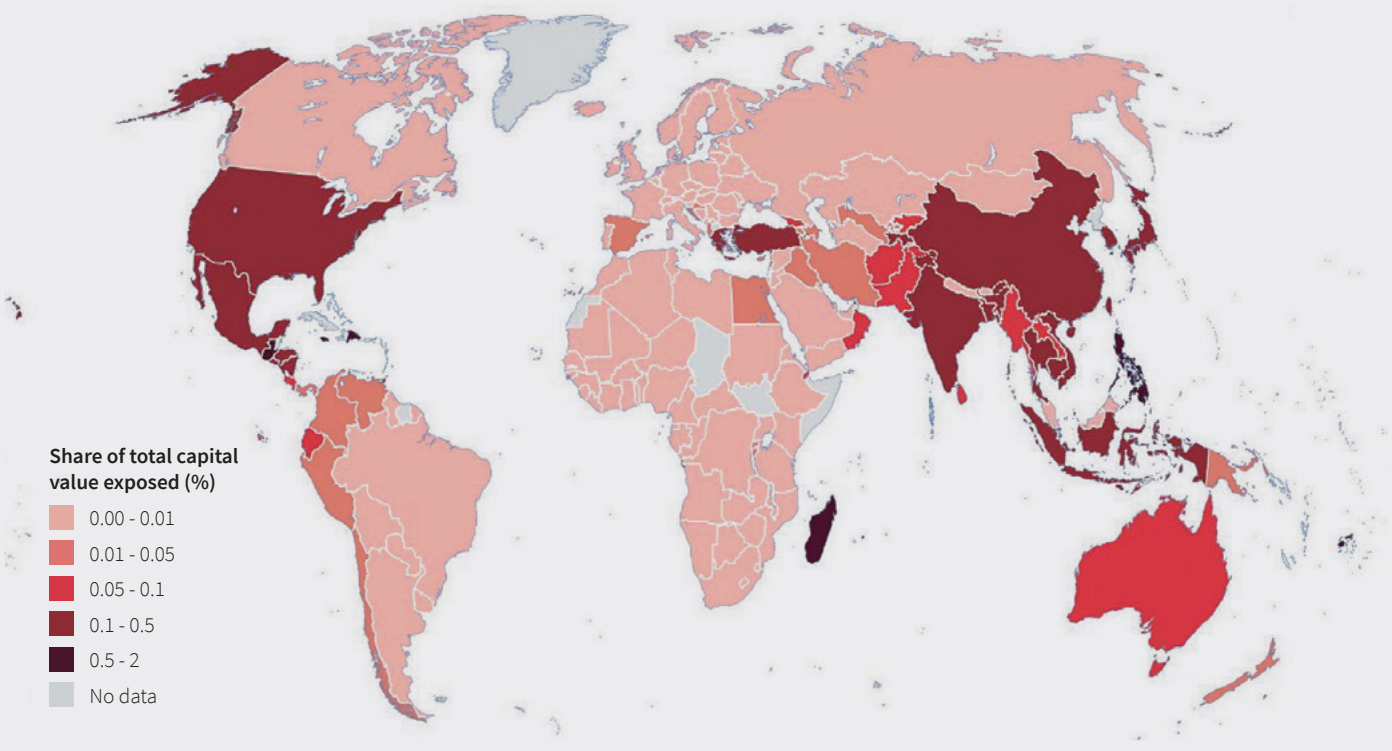
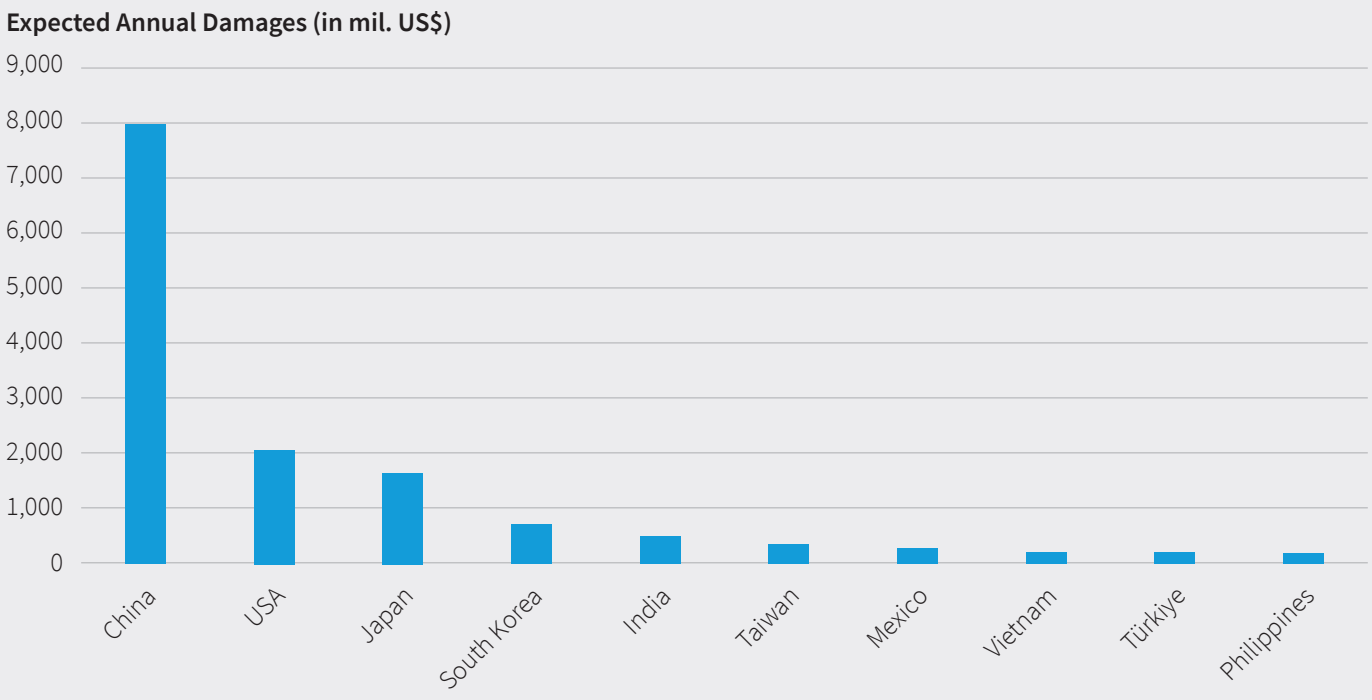
Massive earthquakes in Türkiye and ensuing infrastructure problems and power outages have brought to the forefront issues of natural disaster risk and management of energy systems. According to the World Bank, 74% of power outages worldwide during 2000-2017 were due to natural hazards. **Türkiye, which is one of the countries most exposed to natural hazards, ranks among the top 10 countries in expected annual damages to power generation infrastructure.**

Share of power sector capital value exposed to natural hazards risk as percentage of GDP (%)



Top 10 countries in terms of expected annual damages to power generation infrastructure



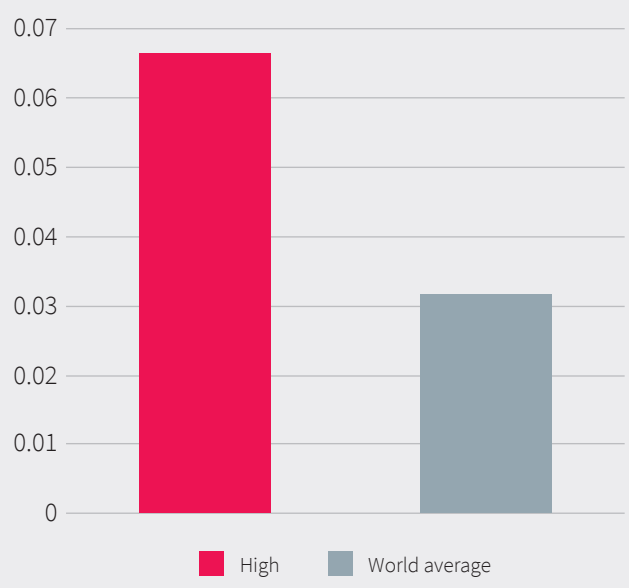
Initial estimates by the government indicate that damages caused by the earthquakes in February 2023 to the power and natural gas infrastructure in Türkiye are worth 529 million US$, corresponding to 0.6% of the GDP in 2022.

Source: World Bank, 2019; SBB, 2023

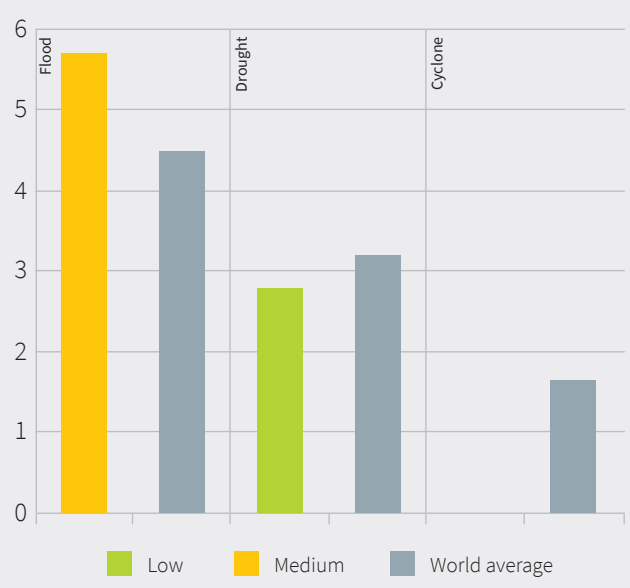
Türkiye's vulnerability to natural disasters is further exacerbated with the impact of climate change. According to the International Energy Agency, since the year 2000, Türkiye's annual level of warming has been significantly higher than the world average with a consequent rise in the level of floods.

Climate hazard assessment

Level of warming in Türkiye, 2000-2020



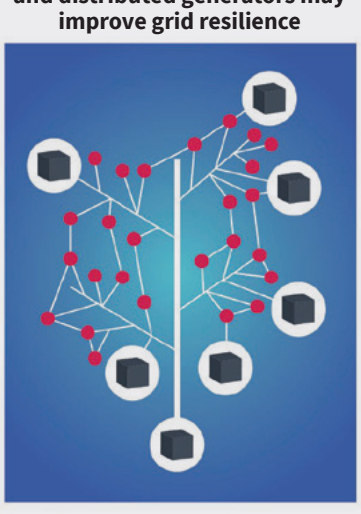
Level of floods, drought and tropical cyclones in Türkiye, 2000-2020



Source: IEA, 2022

Resilience of the power system to natural disasters is closely linked to climate change adaptation and mitigation. National and regional level natural disaster plans in Türkiye, which are in the process of development, should have a holistic approach **to combine strengthening of infrastructure with grid flexibility options offered by a combination of central and distributed renewable energy systems, taking into account increasing electrification.**

A digitally managed, flexible network with interacting central and distributed generators may improve grid resilience



Türkiye's Disaster and Emergency Management System

Source: World Bank, 2019; SBB, 2023

- Infrastructure rebuilding and electricity generation capacity increase in areas impacted by the earthquakes in Türkiye should aim to combine stronger construction standards with decarbonization. According to World Bank estimates, disaster resilient power generation facilities can be built at only 2.5% additional investment cost at the national level when priority is given to the highest risk areas.
- Existing power infrastructure in all regions at risk should be strengthened and maintenance standards should be set in accordance with a national disaster plan, supplemented by regional and sub-regional plans and actions.
- In addition to prevention and resilience, the plans should include disaster emergency response encompassing the provision of material, financial and human resources.