Oman energy efficiency

Oman energy efficiency

Renewable energy and energy efficiency are at the heart of Oman"s commitments, ...

Climate projections indicate that Oman will experience higher temperatures in the coming decades, with more frequent heatwaves. Under a high-emissions scenario,1 the mean annual temperature is projected to rise by about 5?C on average from 1990 to 2100, and the number of days experiencing a warm spell (heatwave)2 is projected to increase from fewer than 15 in 1990 to about 280 days on average in 2100. Under a low-emissions scenario,3 the mean temperature rise could be limited to about 1.5?C and the number of days of heatwave to about 85 on average in 2100.

The projected rise in temperatures and more frequent and intense heatwaves could have negative impacts on gas-fired power plants, which accounted for 97% of electricity generation in Oman as of 2020. The performance of natural gas combined-cycle power plants depends on the air mass flow entering the gas turbine compressor, which is affected by air density and ambient temperature. A continuous increase in ambient temperature may reduce the electricity generation capacity of those power plants unless additional cooling technologies are added.

Climate projections show that around three-quarters of existing gas-fired power plants in Oman are likely to be exposed to over 2?C of warming in a low-emissions scenario (Below 2?C) and over 5?C in a high-emissions scenario (Above 4?C) during 2080-2100, compared with the pre-industrial period.4 If GHG emissions are not mitigated, over 80% of Oman"s gas-fired power plants could experience at least 60 more days with a maximum temperature above 35?C. This share is almost double the world average, given that less than 40% of gas-fired power plants globally are projected to see the same level of increase.

Low rainfall, combined with limited natural freshwater resources, has made Oman one of the most water-stressed countries in the world. Oman has less than 1000m3 of freshwater per capita per year, which is significantly less than the world average of around 5500m3.5 In recent decades the amount of annual rainfall has decreased, adding more stress to freshwater availability. In 2022 rainfall fell to an annual average of just 76.44mm, one-sixteenth of the global average. It made Oman the country with the tenth lowest average rainfall in the world that year.

Future impacts of climate change may aggravate freshwater availability in Oman. Although there could be a slight increase of about 10mm per year around the middle of the 21st century under a low-emissions scenario,6 a high-emissions scenario7 projects a decrease in annual average rainfall in most areas of up to 20mm per year by 2061-2080. In addition, climate projections show that the year-to-year variability in rainfall patterns is likely to increase.

Despite the overall decrease in annual mean precipitation, Oman is also experiencing more frequent flooding.

In May 2020 heavy rainfall damaged energy infrastructure and disrupted the power supply in Salalah. Again, in May 2021 torrential rainfall caused flooding and prompted power cuts for several hours in certain towns in the AlDakhliya and AlBatinah regions.

Low-lying coastal areas are vulnerable to sea level rise. This could trigger saltwater intrusion9 and lead to a decrease in freshwater availability in coastal areas, where the majority of irrigated land (56%) is located. Indeed, by the middle of the 21st century 64% of cultivated land in the southern Al Batinah region will be unfit for groundwater irrigation owing to seawater intrusion into the Jamma aquifer from sea level rise. This could increase demand for desalination, which is generally more energy-intensive than other water supply options.

Tropical cyclones and storms10 from the northern Indian Ocean and the Arabian Sea have increased in frequency and intensity. These storms usually occur during the pre-monsoon period in May and June, and during the post-monsoon period in October and November. In recent years, the areas at risk have increased almost tenfold in the Muscat area, while AlWusta is expected to be the region most vulnerable to tropical cyclones in the future.

The increase in tropical cyclones and storms in Oman could become a concern for the resilience of energy supply infrastructure. In 2021 tropical cyclone Shaheen hit Oman"s northern coast, prompting floods and landslides. It damaged electricity substations, poles and transmission and distribution lines and caused power cuts to around 120000customers in the governorates of Muscat and Al Batinah. Restoration of electricity services took up to 192 hours in South Al Batinah and 384hours in North Al Batinah. In addition, oil and LNG shipping was also suspended at several ports, including Port Sultan Qaboos, A"Suwaiq and Shinas, owing to tropical cyclone Shaheen. The government activated its Emergency Response Plan to prevent interruptions to oil and LNG supply.

This is further developed into Oman"s National Strategy for an Orderly Transition to Net Zero, which aims to reach net zero by 2050 based on five principles: environmental sustainability; minimised energy system costs; optimisation of economic impacts; social implications; and security of supply. Electrification, energy efficiency improvement, transition to EVs and the deployment of renewable power generation are identified as key priority levers.

As a country with high levels of vulnerability to several consequences of climate change, Oman has made notable progress in climate change adaptation and resilience. Oman approved its National Strategy for Adaptation and Mitigation to Climate Change in April 2019, focusing its vision on three themes, one of which is climate adaptation.12 Within this theme, Oman has identified five key vulnerable sectors to focus on: water resources; marine biodiversity; agriculture and fisheries; urban areas; and tourism, infrastructure and public health. Although the energy sector is not explicitly addressed through this, it is covered within the urban areas and infrastructure sector, which considers the impacts of flooding on infrastructure in urban areas, including electricity supply.

Oman energy efficiency

Contact us for free full report

Web: https://kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346