

# Grid emission factors related to electricity generation and evaluation of attitudes towards the idea of carbon dioxide utilization. A Case of Kazakhstan

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(Received June 8, 2023, Revised June 21, 2023, Accepted June 25, 2023)

**Abstract.** The first part of the study involved calculating emission factors from electricity production. The second part of the study aimed to analyze perceptions of the concept of carbon dioxide utilization and was conducted through a questionnaire survey with participants from Almaty and Astana. The results showed that there were no significant improvements in the decrease of carbon dioxide emissions between 2017 and 2020. Almost no change occurred in the rate of carbon dioxide emission throughout the course of the four years. According to the results of the survey, a number of respondents had reservations about the feasibility of using carbon dioxide utilization as a solution to tackle climate change. They felt that this technology would only offer a temporary solution to carbon emissions, without addressing the underlying causes of the problem. Despite these concerns, the participants acknowledged that carbon dioxide utilization had certain advantages in promoting sustainability.

**Keywords:** carbon dioxide utilization; clean development mechanism; electricity production; emission factors; environmental protection; greenhouse gases; sustainability

## 1. Introduction

The combustion of fossil fuels, like coal, oil, or gas, for the generation of electricity significantly contributes to the emission of greenhouse gases, which accumulate in the Earth's

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