Executive Summary

Infrastructure is the backbone of an economy and of high social importance. Investing in the right facilities has a significant impact on the aggregated productivity of an economy and also improves the overall quality of life for the population. At the same time, there is a global shortage of this asset type. Developed countries suffer from rising social expenditures, limiting their budgets. Emerging countries are also facing a lack of financing sources, and many of them do not have an appropriate investment managing structure. These circumstances, the urgent need for a global energy transition towards renewable energy, and a growing population, let rise the need for new infrastructure financing sources. To finance this gap of investments, Western governments started their first movements into the privatization of infrastructure already in the 1980s. Facing climate change challenges makes finding a solution to finance the transition towards non-carbon emitting energy sources crucial. Among policy leaders, there is consensus that the transition cannot proceed without the involvement of private investors. Governments, therefore, implement incentives by optimizing the risk-reward relationship of infrastructure investments through regulatory adjustments.

In general, the infrastructure asset class can be categorized in many ways, while the underlying category can have a huge impact on the risk-return relation. One obvious distinction is the form in which the investment can be made. The most common form of investment is the direct non-listed investment. There, the infrastructure projects are financed by a small group of co-investors such as pension funds and insurances. Other investment forms are direct investments in listed companies or channeling the money through listed or unlisted funds into this asset class. Another fundamental differentiation of infrastructure investments is based on their investment life cycles. Theoretical consensus suggests that the stage of development impacts the risk-reward ratio, but empirical evidence doesn't fully support this. Greenfield investments are high-risk early-stage projects, which tend to offer higher returns but uncertain cash flows. Brownfield investments are considered to be a safer investment, with established and more certain income streams. Infrastructure can also be categorized into four basic risk categories, while it holds that higher risk is generally associated with higher returns: core, core plus, value add, and opportunistic. Core investments are stable and essential to society, with income as the primary return. Core-plus investments offer some capital appreciation potential with more variable cash flows. Value-add investments involve assets with growth potential or in need of repositioning. Opportunistic

investments carry the highest risk but also offer the potential for the highest returns. The sector of the infrastructure facility, as well as its particular location, also plays a crucial role. Different sectors such as transportation, communication, utility, health care, education, and justice have specific risk and return characteristics. The infrastructure facility is influenced by particular sector factors such as economic sensitivity, regulation, and revenue schemes implemented. Empirical studies have shown variations in performance across infrastructure sectors, with health care infrastructure demonstrating the strongest reward-risk profile. Location-related political, regulatory, and institutional factors impact the investment climate and performance of infrastructure assets. A country analysis involves evaluating factors such as macroeconomic policies, supportive institutions, and political stability.

In recent years, infrastructure assets have become attractive to institutional investors seeking high-yielding, income-oriented, inflation-linked, and stable returns. One key characteristic is their diversification potential, with low correlation to other asset classes. Infrastructure investments further have lower market risk than equities, and unlisted assets are less impacted by market sentiment. Idiosyncratic risks arise from construction, location, management, and regulatory changes. Infrastructure assets also exhibit a monopolistic nature, with significant entry barriers and inelastic demand. They are tangible real assets with substantial initial capital requirements, illiquidity, and the potential for higher returns through an illiquidity premium. They also offer wealth preservation through their property or underlying land having a residual value.

This thesis aims to analyse factors influencing renewable energy (RE) infrastructure investment returns in Europe. However, due to limited data availability, other non-infrastructure owning renewable energy firms are also considered. In particular, the thesis considers two macroeconomic events and compares the impact of these on the RE stock portfolio compared against a benchmark. To conduct this analysis, the author used the Difference-in-Differences (DiD) regression methodology. As events, in DiD called treatment, the publishing of the REPowerEU-Plan and the inflation announcement in the Euro area, which was above investors' expectations, are considered. The first treatment, the publishing of the REPowerEU-Plan, aims to make Europe less dependent on carbon dioxide-emitting energy sources to fulfill climate change goals set by the Paris Agreement 2015, as well as to become independent of Russian energy supply. It is evident that such a treatment, which can be translated as support for renewable energy and infrastructure business activities, should have a positive impact on their investment returns. The second treatment considered in this

thesis is the excess inflation. In October 2022, the European Union announced inflation rates above investors' expectations. Considering the hedging property of infrastructure assets, this excess inflation was expected to have a positive impact on the investment returns of European RE infrastructure firms. The subject of analysis includes listed European RE infrastructure and non-infrastructure. As a benchmark, in DiD called control group, the STOXX Europe 600 price index is used.

The results are not significant throughout the whole thesis. Neither the publishing of the REPowerEU-Plan nor the excess inflation led to the expected results; both did not reject the null hypothesis that there is any difference in return pre- and post-publishing of European renewable energy stocks compared to the benchmark. However, the results for the first treatment indicate a positive impact and are associated with an average 0.20 percentage point higher return of European RE stocks. Surprisingly, if only European RE infrastructure firms are considered, we have the opposite sign, meaning that the benchmark had performed better than this particular sub-sample portfolio. In further sub-analysis, potential bias from variable omission has been tested and rejected. In particular, the Book-to-Market, Size, and Profitability return factors were considered. For the second treatment, the announcement of excess inflation in the Euro area, the results indicate a sharper reaction for the European RE infrastructure stocks compared to the control group after the publishing. However, the sign is negative, indicating that excess inflation had a more positive impact on the benchmark return than the RE infrastructure portfolio. This result is contrary to theory, supposing no inflation hedging property of infrastructure assets.

The results of this thesis are inconclusive and lack statistical significance, possibly due to the uncertain investment environment caused by factors such as inflation, energy crises, and war. These conditions might keep investors cautious, leading to weaker or negligible expected effects. Another reason for non-significant results could be the insufficient data driven by the condition that infrastructure investments are typically structured as Project Finance or Public-Private Partnerships. Additionally, the small sample size further limits the study.