Globally, the increase in environmental pollution is occurring due to rapid industrialization and urbanization. Steel is a major constituent of infrastructure development and it is an alloy of iron and carbon. In Pakistan, steel re-rolling as the secondary steel market has a more progressive outlook than the primary steel market due to easy raw material availability. Steel re-rolling mills execute hot rolling processes to generate various steel products of different sizes and shapes by molding raw steel. About 1000-1200°C temperature is maintained in the heating furnace during the production process. This heating process consumes 70% of the total energy which accounts for 30% of the total production cost. Steel re-rolling in Pakistan is responsible for various environmental emissions due to fossil fuel burning. The present study performs gate-to-gate Life Cycle Assessment of steel re-rolling in Pakistan by considering four scenarios based on fuel and air emission mitigation. The study shows the high impact scores of 8 selected impact categories without any mitigation system. Moreover, Material Flow Analysis is conducted to assess the input and output flows of the process. Economic analysis of various air emission mitigation systems has been done by considering 4 economic indicators. The present study finds that the cyclone wet-scrubber hybrid system is a cost-effective and efficient air mitigation solution. Its benefit to cost ratio is 1.378 and has a life of 25 years. The removal efficiency of particulate matter is 98% and has a low maintenance cost compared to air bags. The study suggests that sustainable fuel consumption must be ensured and installation of air emission devices must be maximized. Strong actions of environmental protection agencies and governmental bodies is required to control these environmental emissions.