Cell designs that integrate membrane-electrode assemblies (MEAs) with highly selective catalysts are a promising route to reduce ohmic losses and achieve high energy efficiency in CO₂ reduction at industrially relevant current densities. In this work, porous silver filtration membranes are demonstrated as simple and efficient gas-diffusion electrodes for CO₂ reduction to CO at high current densities in a MEA-type device. A partial current density for CO of up to ca. 200 mA cm⁻² was achieved at a cell voltage of ca. 3.3 V, in tandem with minimal H₂ production. However, the analysis of cathodic and anodic outlet streams revealed that CO₂ crossover across the AEM, mostly in the form of CO₃²⁻ but partially as HCOO⁻ generated over the cathode, actually exceeds the amount of CO₂ converted to the target product, resulting in a poor utilization of the reactant and in the early onset of mass transfer limitations. In addition, CO₂ crossover leads to non-stoichiometric decrease of the outlet flow rate from the cathodic compartment that can lead to a substantial overestimation of catalytic performance if the inlet flow rate of CO₂ is used as reference for calculating partial current densities and Faradaic efficiencies. The results of this work highlight the importance of carrying out a carbon balance, in addition to traditional measurements of activity and selectivity, to adequately assess the performance of CO₂ reduction devices at high current densities, and inform future efforts aimed at mitigating membrane crossover in MEA-type electrolyzers for CO₂ reduction.