Economic Viability: How can we incentivize widespread adoption of CCS technologies by industries and governments, considering the high upfront costs and uncertain financial returns associated with implementing and operating CCS infrastructure?

To incentivize widespread CCS adoption despite high upfront costs and uncertain returns, a combination of financial, policy, and market mechanisms is necessary. Establishing robust carbon pricing or expanding incentives such as the U.S. 45Q tax credit can directly reward CO2 sequestration, reducing financial risk and making CCS more competitive with unabated fossil fuel use. Governments can also play a critical role through public–private partnerships that co-invest in pilot projects and shared transport or storage infrastructure, lowering the capital burden on individual firms.

Another pathway is to create revenue streams from CO2 utilization. Captured CO2 can be sold for enhanced oil recovery or industrial applications, providing income that offsets the cost of capture and storage. Increasing government support for research and development can improve capture efficiency, reduce energy penalties, and develop safer, cheaper transport and storage solutions. Financial tools such as loan guarantees or insurance against storage risks can further attract private investment by mitigating perceived risks.

In parallel, clean energy standards and procurement policies that require low-carbon industrial products, such as “green steel” or low-carbon cement, can generate reliable markets for CCS-enabled industries. Finally, transparent communication and active public engagement are essential to address safety, equity, and environmental concerns, building the trust needed for permitting pipelines and storage sites. Together, these strategies can transform CCS into an economically viable and scalable technology for achieving global climate targets.