Ldes liftoff report

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Today, the Department of Energy releasedits fourth Pathways to Commercial Liftoff report, focused oncarbon management, on the heels of last month"slaunchof the Liftoff effort and thereleaseof its first three reports focused on clean hydrogen, advanced nuclear, and long duration energy storage.

Today, the United Statesleads the world in carbon management deployment,with over 20 million tonnes of CO2per annum (MTPA) of carbon capture capacity. But this is just 1 to 5 percent of what could be needed by 2050: the U.S. will likely need to capture and permanently store approximately 400 to 1,800 MTPA to meet its net-zero commitments by 2050. This scale-up represents a massive investment opportunity of up to approximately $100 billion by 2030 and $600 billion by 2050.

Aportfolio of carbon management technologies for a suite of applications are commercially mature and ready to deploy today. There are several dozen commercial-scale carbon management projects currently in operation and well over a hundred in stages of project development.The report discusses the whole carbon management ecosystem, including point-source carbon capture, utilization, and storage (CCUS) and carbon dioxide removal technologies (CDR).

As the report lays out, industry is poised to allocate billions of dollars in capital towards carbon management technologies, driven by industries with attractive economics for CCUS, like ethanol, natural gas processing, ammonia, as well as other large integrated projects. This is enabled by the current supportive policy framework, partly based on recent changes from the Inflation Reduction Act. The United States also has excellent storage geology andrelatively abundantlow-costzero-carbon energy resources that can power CDR projects.

The report also discusses the real but solvable barriers to carbon management technology deployment at scale. These include breaking through near-term bottlenecks in transport and storage, including permitting, siting, and community buy-in; long-term revenue certainty; challenging project economics in hard to decarbonize sectors such as cement, steel, refining, and chemicals, and other barriers.

The Liftoff reports provide the private sector and other industry partners a valuable, engagement-driven resource on how and when certain technologies can reach full scale deployment. The new initiative underscores the critical role that DOE plays in enabling widespread commercial adoption of the clean energy technologies that are essential to meeting President Biden"s ambitious goals of achieving 100% clean electricity by 2035 and a net-zero emissions economy by 2050.

The Pathways to Commercial Liftoff reports were developed through extensive stakeholder engagement and a combination of system-level modeling and project-level financial modeling. Additional reports will be added in the coming months.

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The U.S. DOE has published a report outlining the requirements for LDES to achieve technical and financial self-sustainability by the end of decade. An estimated $6 billion to $9 billion dollars in capital investment would be necessary, potentially leading to 6 GW to 10 GW of project deployments.

The Department of Energy (DOE) released a report titled, "Pathways to Commercial Liftoff: Long Duration Energy Storage" (LDES). The report analyzes prerequisites for two forms of LDES systems to transition from their nascent, research-based status to a more robust position, attracting up to $530 billion in cumulative investment and significantly influencing the firmness and cleanliness of the power grid by 2050.

DOE states that maintaining this trajectory will require the deployment of six to 10 GW of LDES projects and the allocation of $6 billion to $9 billion in capital investment by 2030. To align with the 2050 goals, it will need to establish a manufacturing capacity of 10 to 15 GW and roll out further deployments by 2035.

The specified objectives for 2050 include the deployment of 225 GW to 460 GW of LDES capacity, which is projected to save $10 billion to $20 billion annually, compared to scenarios without such deployment.

The report explores two specific types of long-duration storage. Inter-day LDES, one of the types, facilitates power shifts spanning 10 to 36 hours, primarily via mechanical batteries such as pumped hydro, gravity-based storage, compressed air, liquid air, and liquid CO2 technologies. The second category, multi-day/week batteries, shifts power over periods extending from 36 to more than 160 hours. Noteworthy multi-day thermal and electrochemical batteries include various heat products, flow, and metal anode products.

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