

Global and Regional Markets for Carbon Capture and Sequestration (CCS) Infrastructure and Equipment

<https://marketpublishers.com/r/G34BFF15F35EN.html>

Date: August 2013

Pages: 268

Price: US\$ 3,960.00 (Single User License)

ID: G34BFF15F35EN

Abstracts

Portrayed in the past five years as a pipe dream, technological savior and prudent investment to complement existing energy infrastructure, carbon capture and sequestration (CCS; also known as carbon capture and storage) is projected by SBI Energy as a complementary, sometimes marginal, technology in the global effort towards carbon dioxide emissions reduction. Representing approximately \$(U.S.) 650 million in 2013 investment, global CCS infrastructure deployment is projected to intensify significantly to over \$2.4 billion in 2020. Through the end of this report's scope (2037), CCS is not projected to represent more than 25% of carbon emissions reductions below baseline even in the most active markets (e.g., North America, Europe). Other regions such as Latin America and Asia-Pacific will rely on CCS for less than 5% of necessary carbon emissions reductions.

Carbon management is already a prime destination for energy and industrial sector investment dollars. Regulatory limits, taxation and price setting on carbon dioxide emissions as a greenhouse gas (GHG) pollutant has spurred industries worldwide to invest in emissions reduction technologies and practices. Improvements to energy efficiency, use of alternative lower- or non-emitting energy resources and economic transformation have largely produced the carbon emissions reductions in the past decade. However, these trends alone will be unable to achieve the global carbon emissions reductions necessary to avert catastrophic climate change. CCS is widely viewed as a technologically viable method for the significant mitigation of fossil fuel-associated carbon emissions worthy of additional development and future deployment.

This report provides extensive and detailed projections for global and regional CCS markets through 2037, as well as a review of the historical markets for CCS technology since 2008. Markets are valued by total capital expenditure (CAPEX) investment in CCS

infrastructure and by equipment orders. Cumulative estimated equipment orders for the period of 2020-2037 are segmented by carbon post-combustion absorption and removal, compression, air separation (ASU), water-gas shift (WGS), and balance of plant (BoP) equipment. Market segmentation is provided by CCS phase (capture, transportation, storage), region, capture source (power/industry), client or project type (historical market only / merchant capture, enhanced oil recovery [EOR], CCS project) and capture method (post-combustion, pre-combustion, oxyfuel). Regional carbon capture capacities and sequestration rates are also provided in terms of million metric tonnes (MMT) annually. The relative contribution of CCS and other factors to carbon emissions reductions below baseline (or default emissions trajectories) are also provided through 2037.

What You'll Get in This Report

Global and Regional Markets for CCS Infrastructure and Equipment, 2008-2037 provides readers with extensive and detailed projections befitting of a still emerging technology market with undoubted applications in future markets burdened by crucial emissions targets. Readers can expect to find grounded, extensively researched and meticulously modeled market projections that reveal the most probable realities of future CCS deployment worldwide. Data provided in the report is supported by thorough author discussion of regional, regulatory, industry and technological factors shaping the market as well as informed overviews of important CCS projects and players. Additional support for the data comes in the form of contextual forecasts for regional carbon emissions and expected emissions reductions from falling economic energy intensity, greater generation from renewable and nuclear energy resources, and declining carbon intensity from fossil fuel generation.

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The energy efficiency or lack thereof of any energy consumer (business, country, and supranational bloc) can be broadly assessed through its energy intensity measure or ratio of energy consumption to economic output. Generally, energy intensity is described through the total primary energy consumption of a country divided by its gross domestic product (GDP). Reduced energy intensity is strongly correlated with GHG emissions reduction as lower energy consumption generally entails less fossil fuel consumption. Energy intensity reductions can be achieved through a variety of factors and processes:

- Decreased share of manufacturing out of total economic output, typically through economic transitioning to a service economy or economic recession disproportionately impacting manufacturing
- Reduced demand for heating and cooling due to environmental climate factors
- Increased vehicle fuel economy standards or greater miles travelled per unit of energy
- Reduced grid energy losses due to improved grid operation in generation, transmission and distribution
- Improved energy efficiency standards for lighting, appliances and equipment
- Improved building energy efficiency that reduces demand for heating and cooling
- General conservation practices and mitigation of avoidable energy waste

Energy intensity provides a valuable indicator for assessing emission reductions and economic trends in a country over a long period of time. However, energy intensity is also problematic in that it “overstates the extent to which [true] energy efficiency improvements have occurred in the economy.”⁶ Economic growths in developed countries can often outpace growth in energy consumption to produce a declining energy intensity factor, but without any meaningful underlying improvement in energy efficiency. National energy intensity can also neglect manufacturing outsourcing (as a more energy-intensive business activity) to international trade partners.

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