**BLUE PLANET: CARBON CAPTURE AND REUTILIZATION**

To decarbonizes electrical power generation, CO2 must be efficiently removed and stored on a large scale, because simple reductions in carbon emissions alone can not achieve the necessary reductions to prevent Climate Change. Blue Planet's solution is to commercialize its patented method for converting the CO2 captured from the flu gas of coal and gas-fired power plants, cement plants, or any other source, into solid building materials: cement or aggregate. The resulting cement or aggregate can be combined to form concrete for use in roads, bridges, dams or buildings. The CO2 is permanently chemically bonded as carbonate inside the cement or aggregate without leaching into ground water or releasing into the air. Blue Planet also captures the NOX, SO2,  particulates, and heavy metals (mercury, lead, arsenic) from power plants and permanently sequesters them in building materials. By profitably converting waste CO2 into valuable building products, Blue Planet sets a course for profitably improving air quality, respiratory health and impacting Climate Change. There are over 5,000 power plants worldwide with emissions of over 100,000 tons per year of CO2, aggregating to almost 12B tons per year. For each ton of CO2 captured, Blue Planet produces 2 tons of cement or aggregate. Cement plants today produce about 3.4 B tons of cement and emit about 0.9 tons of CO2 (3B tons) for each ton of cement produced, so the production of a ton of cement by Blue Planet not only sequesters ½ ton of CO2, but also off-sets the production of almost one ton of CO2. By making and selling cement or aggregate, Blue Planet expects to be profitable with its first commercial-scale plant.

**SCOPE OF THE CHALLENGE**

In 2010, the world emitted approximately 30B tons of CO2. Seventy percent (70%) of global electricity demand is met through the burning of carbon-based (CO2) fuels (coal and natural gas), with demand for electricity projected to double by 2035. Growing demand for electricity leads to more coal and gas-fired power plants. Hardest hit are the cities of the developing world. Their populations are threatened with respiratory disease, diminished quality of life and shortened life spans. The accumulating CO2 discharge adds to the "green-house effect" which accelerates Global Warming and Climate Change. About half of the world’s CO2 emissions are from large stationary sources (15B tons) with another 23% from transportation (7B tons). In addition to power plants and cement plants, management believes that Blue Planet's solution can also impact transportation-related CO2 as electric vehicles become more popular and their emissions are captured upstream at the power-plant level by its patented technology.

The Copenhagen Accord set the goal of reducing CO2 emissions to 80% of the 1990 levels by 2050. By 2020, the Accord requires CO2 reductions of about 20B tons. Installation of Blue Planet's systems on all of the world's 5,000 coal and gas fired plants would achieve 60% of the CO2 emission reduction goal for 2020 while making 24B tons of cement and aggregate--without exceeding the world's demand for these building materials.

**CARBON CAPTURE AND SEQUESTRATION**

Carbon Capture and Geological Sequestration (CCS) is widely recognized as having the greatest potential for worldwide carbon mitigation. Since its recognized that lowering carbon from fossil fuel combustion alone will not curb climate change, CCS, which involves the separation of CO2 from power plant flue gases for liquidification, transport, geologic storage, and monitoring, has been extensively investigated. CCS uses a significant amount of the power load from the host plant, and provides no revenue source for the CO2, only a liability. The cost of CCS has effectively kept most CCS efforts worldwide at the research level. Blue Planet is focused on capturing the CO2, but instead of simply burying it underground, they are focused on turning into building materials that can generate revenue for the Company.

**BLUE PLANET – GENERATION 2 TECHNOLOGY**

Blue Planet has developed a second generation patented approach to efficiently and profitably manufacturer green building products converting CO2 gases into highly demanded building products. Blue Planet converts dirty power plants into clean burning and profitable CO2 recyclers.

**Generation 1 Technology** – In the past five years, several companies attempted to capture CO2 and convert it into profitable materials. They used an electrochemical approach to capturing the CO2 from the flu-gas (Front End) as well as an electrochemical approach of conversion to building materials (Back End). Developments in the past few years have led to a second generation approach that significantly reduces costs, both capital expenditures (Cap Ex) and operating expenses (Op Ex) by avoiding most of the need for electrochemistry.

**New Technology for Front End (Gen 2)** – Blue Planet's method of capturing the CO2 from flu gas uses a completely new approach using enzymatic catalysts that were recently developed by three separate companies as well as several National Laboratories. This new system is much less expensive in both Cap Ex and Op Ex than the electrochemical front-ends used by Generation 1 companies. Enzymatic catalysts accelerate the absorption of CO2 by three to five orders of magnitude, reducing plant size dramatically as well as the volume of chemicals needed for the process.

**New Technology for Back End (Gen 2)** – Building on this new capability, Dr. Constantz has invented a new patented back-end system (Generation 2) for making cement and aggregate that integrates with the new front-end (Gen 2). Unlike Generation 1 systems, Blue Planet believes it has a method for removing CO2 from coal fired power plants converting it into cement or aggregate in an economically efficient and scalable manner--independent of potential revenue from sales of carbon credits or tax credits.

**COMPETITION**

**Generation 1 Competitors** – The US companies developing Generation I Technology to produce product revenue from captured CO2 are: New Sky Energy of Boulder Colorado, Skyonics of Austin, Texas, and Calera of Los Gatos, California. All three Generation I companies have developed, and sought intellectual property protection on electrochemical methods of converting CO2 to bicarbonate or carbonate. Electrochemistry is inherently energy intensive and expensive, limiting the practical implementation of Generation I substantially. The intellectual property positions of the three companies largely overlap and there is significant doubt regarding priority and novelty in all three cases. All three companies are pursuing bicarbonate products instead of carbonate products in order to reduce the amount of electrochemistry needed by one half compared to carbonate products. Bicarbonate products, such as baking soda (sodium bicarbonate) are soluble, so have very limited application in building materials. Carbonate minerals, as Blue Planet is developing, are insoluble and have import, large market applications for the durable built environment.

**Cement and Aggregate Industry** – Global markets for cement (3.4B tons) and aggregate (37.4B tons) are enormous. Several non-US cement companies, Cemex (Mexican), LaFarge (French), Heidelberg (German), Holcium (Swiss), Old Castle (Irish), and Mitsubishi (Japanese) dominate both the production of cement, and are also frequently vertically integrated, and also own the sites of concrete distribution (ReadyMix plants). Under intense pressure to lower the carbon intensity of traditional cement, these companies have made efforts to replace the cement in aggregate will fillers know as “supplementary cementitious materials” or SCMs. The most common SCM is fly ash, a waste product from burning coal. Ground limestone is also used for this purpose. The appropriate type of fly ash has become in short supply and become almost as expensive as cement in many venues as a result. Ground limestone is limited as to its possible volume of cement substitution. These methods only reduce the carbon intensity of cement.

Aggregate can be produced anywhere an open pit rock quarry can be established. This is also how the limestone and shale feed stocks for cement manufacturing are derived. Due to increasing global awareness of the environmental impact of open pit mining, aggregate shortages have developed in many countries, and the problem is expected to worsen as the limitations on open pit mining become even stricter. Aggregate pricing is related significantly to transportation costs. As the local access to open pit mining becomes scarcer, aggregate must be transported for longer and longer distances, increasing the cost and carbon footprints substantially. The State of California, for example, imports a significant amount of it’s 250 million tons of annual aggregate from Canada and Mexico, and a third of the counties in the State have less than a 10 year supply of aggregate from local quarries.

**INTELECTUAL PROPERTY**

Because of both licensed patents and new patent filings, Blue Planet has already developed a strong intellectual property position in the field. In fact, our licensed patents have years of priority before the patents of the three Generation I companies. Further, Blue Planet’s newly filed patents substantially protect our second generation approach from new competition developing and bar Generation I companies from imitating Blue Planet.

**CARBON REGULATION**

**California**. Demand drivers for installation of the Company's systems in coal and gas plants include California Bill AB32 passed in 2006, commonly known as "Cap-and-Trade." AB32 requires California to reduce its CO2 by 80% by 2050. The bill takes effect on January 1, 2013. Regulations promulgated under AB32 require California's power producers to purchase carbon credits from exchanges. California’s first carbon credit auction established an initial price of $10/ton of CO2, a price expected to increase overtime. This provides a potential new stream of revenue for Blue Planet.

**China**. The Peoples' Republic of China is establishing its own regional cap-and-trade system in several of its provinces. Provincial governments are pushing for a national program by the end of the decade. Chinese delegations in the US are studying California’s climate program. [China](http://topics.bloomberg.com/china/)’s first steps to build what is destined to be the world’s second-biggest emissions market are boosting the prospects for fledgling programs from [Australia](http://topics.bloomberg.com/australia/) to [California](http://topics.bloomberg.com/california/).

Recently four Chinese cement makers bought 1.3 million pollution permits for 60 [Yuan](http://topics.bloomberg.com/yuan/) ($9.55) a metric ton in Guangdong province. Guangdong is planning the largest of seven pilot programs for a proposed national market. The proposed system calls for exchanges that buy and sell permits that allow emissions of a billion metric tons of [greenhouse gases](http://topics.bloomberg.com/greenhouse-gases/) annually (approximately half the volume of the European Union system.)

**United Nations Framework Convention on Climate Change – Worldwide**. The 2009 Copenhagen Accord was signed by over 100 countries including the US, China and India, the world’s three largest carbon emitters. The Accord calls for spending of as much as $100 billion a year to develop low-carbon energy systems and other technologies. Although the 2009 financial crisis slowed resolve, momentum is rebuilding with the 2012 U.S. Presidential election and AB 32's first auction of carbon credits. Blue Planet’s financial model has not factored any additional revenue from selling carbon credits, tax credits or other value placed on carbon.

**CUSTOMERS AND MARKETS FOR GREEN CEMENT AND LIGHTWEIGHT AGGREGATE**

By weight and volume, cement and aggregate, which together make concrete, are the most highly demanded building materials in the world. The worldwide market for aggregate in 2011 was over 37B tons and for cement was over 3.4B tons each with a market value of over $300B. States, counties and municipalities will be the primary customers for the Company’s green cement products. These products are ideally suited for roads, bridges, dams and buildings. Secondary customers will be construction companies. The market price of cement is approximately $100 per ton worldwide. Aggregate sells for $10 to $40 per ton depending on location. Transportation cost can be a significant portion of the sale price. There is a specialty niche market for “White Cement” which sells for as high as $200 per ton with an estimated worldwide market of 8M tons per year. Lightweight aggregate is a niche product selling for $40 to $80 per ton with an estimated global market of 20M tons per year. As prices for these niche products drop, management believes that their relatively inelastic demand curves will significantly increase the quantity demanded. The Company will initially focus on these high-priced building materials, primarily white cement and lightweight aggregates.

**BLUE PLANET COMMERCIAL-SCALE PLANT**

Blue Planet's solution captures the CO2 emissions from the flu-gas of coal and gas fired power plants. For each ton of CO2 captured, Blue Planet manufactures 2 tons of cement or aggregate or combination thereof. Blue Planet plans to co-locate on site with large power plants with an initial focus on coal-fired power plants importing power to California and in China. One 500MW coal fired power plant emits about 8M tons of CO2. Depending on plant configuration, Blue Planet may choose to capture 50% of emissions or 4M tons of CO2, which would then convert into 8M tons of cement or aggregate. To retrofit a coal plant of this size is projected to cost around $250M. Blue Planet aims to become a Best Available Retrofit Technology (BART) per EPA regulations for curbing carbon dioxide, as well as SO2, NOx, particulates, and heavy metals, emitted from coal-fired power plants. Long-term, Blue Planet could become a Best Available Control Technology (BACT) on newly built Greenfield coal-fired power plants.

Blue Planet's green cement not only removes CO2 from power plants, but also eliminates CO2 emissions from cement manufacturers as Blue Planet's cement is substituted for traditional cement as well as eliminating ecological damage from strip mining and associated water and energy diversions of mining aggregate and limestone used in the production of cement.

Management believes there will be substantial interest to assist in financing the commercial-scale plant from strategic partners such as electric power producers, coal companies, cement manufacturers, the US Department of Energy, the California Air Resources Board (CARB), the California Public Utilities Commission, the Ministry of Industry for the Peoples' Republic of China, large multi-national engineering and construction companies and others.