

4.2: Biomimicry

Biomimicry is an innovative method that searches for sustainable solutions by imitating features naturally found in the environment into the design of products. Using biomimicry, sustainable businesses can look at nature in new ways to understand how it can be used to help solve problems. Nature can be seen in three different perspectives: nature as model, nature as measure, and nature as mentor. Benyus (1997). Nature as model implies the emulation of forms, processes, or systems in product design. Nature as measure implies the evaluation of what is being designed against criteria of nature to see if current methods are as efficient as those from nature. Nature as mentor means creating a bond or relationship with nature, treating nature as a partner and teacher rather than just a place for resource removal. Benyus (1997).

Many industries have benefited from biomimicry. In the transportation industry, the fastest train in the world, the Shinkansen Bullet Train of the Japan Railways Group, incorporated biomimicry design methods into its revised design. With the initial design of the train, a loud noise was produced when the bullet train emerged from a tunnel. Designers redesigned the nose of the train after the beak of a kingfisher, which dives into water to catch fish. Not only did the modification create a quieter train, but it also resulted in less electricity usage and faster travel time. Biomimicry Institute (2009). This is an excellent example of utilizing nature to improve engineering.

Another example is GreenShield, a fabric finish made by G3i, which provides the same water and stain repellency as conventional fabric finishes with 8 times fewer harmful chemicals. Biomimicry Institute (2009). The innovation was developed from the water repellency of the leaves of a lotus plant. The plant's surface texture traps air so that water droplets float and slide off cleanly while removing the dirt.

After studying the flippers, fins, and tails of whales, dolphins, and sharks, the company WhalePower applied biomimicry to design a far more efficient wind turbine blade with less drag, increased lift, and delayed stall. The company expects to apply its design to fan blades of all types to gain up to 20% increased efficiencies and quieter operations. WhalePower (n.d.).

The air conditioning system of Eastgate Building, an office building in Zimbabwe, was modeled from self-cooling mounds made by termites. The building uses 90% less energy than conventional buildings of the same size, and the owners have been able to spend \$3.5 million less on air-conditioning costs. Biomimicry Institute (2009).

These are but a few examples of the many improvements in design that have been brought about through biomimicry, or nature-inspired design. Sustainable businesses can find workshops, research reports, biological consulting, field excursions, and other resource information from the Biomimicry Guild, an environmental consultation firm, and from the Biomimicry Institution, a nonprofit advocacy group. The Institute has developed an online interactive resource, AskNature.org, Retrieved March 23, 2009, from <http://www.asknature.org> which allows users to pose a problem, and feedback is provided in the form of multiple ideas or examples from nature that might be useful in solving the problem.

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