



Top 10 Predictions for Environmental Technologies

We may not be living on the moon or driving “flying” cars by 2009. However, researchers at the Department of Energy’s Pacific Northwest National Laboratory predict we’ll be drinking safer water, eating genetically engineered food, and heating/cooling our homes and buildings with micro heat pumps that fit in the palm of a hand. Here are their top ten choices for environmental technology advances:



Agrogenetics—Genetic engineering and plant manipulation will reduce agricultural impacts on the environment. Growing crops will require less pesticide due to greater resistance to pests. Other crops will be engineered to use their nutrients efficiently, requiring less fertilizer or water while providing higher yields.



Smart Water Treatment—Smart membranes, or filters, will improve water treatment of sewage plants and municipal water supplies by adjusting simply or even automatically to unclog themselves. Membranes and other techniques will remove organic compounds, which currently can result in undesired reactions with chlorine. Sponge-like grains of sand will attract and hold nitrates and heavy metals to further protect drinking water in large and small systems.



Renewable Energy Storage—Improved power storage will increase the use of electricity from solar and wind power. Solar power collected during the day could be stored in rapidly spinning flywheels and used at night. The result will be power on demand instead of when the sun shines or wind blows.



Micro Is Beautiful—Micro technology for producing and using everything from chemicals to energy will provide economic and environmental advantages. Room air will be heated and cooled more efficiently in tiny channels of micro heat pumps, saving energy. Micro chemical plants will produce industrial chemicals as needed, thereby eliminating storage and transportation safety issues.



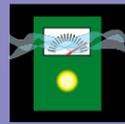
Paperless—Innovative displays, wireless communications, and customized web magazines will help reduce mounds of paper as well as the environmental impacts from paper and ink manufacturing and use. Advanced display systems may imitate paper in their flexibility and portability. One approach will project images directly on the retina of the eye. This capability, coupled with cellular phones, could provide everyone with faxes and customized news virtually anywhere.



Molecular Design—An understanding of how materials behave at the molecular level will help in the development of advanced materials and more efficient solar cells. Molecular design of catalysts could make chemical reactions and processing so precise that little or no wastes are produced. And sensors designed at the molecular level will monitor manufacturing of materials and chemicals more precisely, halting or correcting processes sensitive to temperature changes and other parameters.



Bioprocessing Grows more Products—Microorganisms and plants will “grow” environmentally friendly chemicals and biological products such as drugs, proteins, and enzymes for many uses.



Real-time Environmental Sensors—These innovative sensors will be a major boon to public health. Supermarkets will use sensors to detect E. coli and other dangerous pathogens in food. Workplace air quality will be monitored to prevent “sick building syndrome.” Other benefits include monitoring the environment in airplanes, in hospitals to prevent infections, and in municipal water supplies. The same technology will help guard against pathogens used in biological terrorism.



Environmanufacturing and Recycling—“Green” companies will create products that are environmentally friendly from cradle to grave. Plastics, paper, beverage containers, and inks, as well as cars and computers will be more biodegradable or recyclable. Also, newer processes, such as dry cleaning with liquid carbon dioxide, will minimize or eliminate waste. Hazardous chemicals no longer will be used to clean clothes, and carbon dioxide will be captured and recycled so as not to add to atmospheric carbon.



Lightweight Cars—Squeezing every ounce possible out of cars will mean a family sedan that gets at least 80 miles per gallon of gas, generates less pollution, and uses less gas. Lighter cars will be built with less steel and more lightweight aluminum, magnesium, titanium, and composites. Advanced metal-forming techniques will provide precisely the strength needed at every point, eliminating all excess weight from today’s designs.