V. ADVANCED VEHICLE TECHNOLOGIES

A. Advanced technologies are emerging that offer dramatic reductions in conventional and toxic pollution and greenhouse gas emissions in the near-term. The best versions of these emerging technologies must be encouraged with well-designed environmental performance standards and economic instruments.

B. Hybrid electric technologies now entering the market are particularly worthy of policy support: these vehicles offer large benefits in energy and environmental performance (with potential for further improvement), incorporate electric-drive systems and components that are also used in fuel cell vehicles, have market appeal due to their road performance and technology cachet, and are already available at relatively small incremental cost. For all of these reasons, efforts now to help automakers build sales of well-designed hybrids can pay big environmental dividends in the future. Advanced, high-efficiency diesels equipped with emissions controls equivalent to the best gasoline levels can offer similar potential. There are also advanced non-hybrid gasoline technologies, such as gasoline-direct-injection (GDI), that may offer excellent marketability and environmental performance, provided that they too have appropriate emissions controls.

C. Policies to encourage the best—most environmentally benign and forward-looking—emerging technologies must distinguish those vehicles that provide compelling social benefit and are therefore most deserving of public support. This discrimination is particularly important for hybrid-electric vehicles—the "hybrid" designation is used today to encompass a range of designs with varying levels of energy and environmental performance.

D. Environmental performance criteria to distinguish the best emerging technologies might stipulate that vehicles must:

1. Produce extremely low levels of conventional pollutants and toxics. For example (passenger cars), the Toyota Prius and Honda Civic Hybrid are certified to the California SULEV (U.S. EPA Bin 2) standards of 0.01 g/mile hydrocarbons, 0.02 g/mile NO_x, and 0.01g/mile diesel particulate (0.0063, 0.0125, and 0.0063 g/km, respectively).

2. Produce global warming emissions that are substantially lower than current new vehicle averages, for passenger cars perhaps 120 gm-CO_2/km or lower.

E. If technology standards are necessary, they should have high potential to move vehicles toward the environmental performance criteria. Such standards might require vehicles to:

1. Include two power sources to propel the vehicle, employ regenerative braking, and have idle-off capability.

2. Employ an electrical system operating at greater than 60 volts—the 60 volt minimum is a standard cut point for electric system design and separates hybrids from the more evolutionary 42-volt systems that simply use a small battery and motor to provide stop-start operation.

3. Provide 10 percent or more of the vehicle's peak power from the energy storage device (e.g., battery, ultra-capacitor, or flywheel). This ensures that hybrids encourage progress toward higher-power batteries, motors, and controllers.

4. These standards should be updated as technology evolves.

F. National efforts to develop other advanced technologies such as fuel cells should be coordinated across boundaries to accelerate learning and create a critical mass of research, infrastructure, and deployment.

G. Special attention should be paid to advanced technologies that can reduce the fuel consumption and pollution of 2- and 3-wheeled vehicles.