Oral Testimony of

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Good morning. My name is Tom Stricker, and I am National Manager of Technical & Regulatory Affairs for Toyota Motor North America. I want to thank Chairman Saxton and the Committee for the opportunity to be here today.

Toyota is a company that has undergone a lot of change over the years, especially here in the US. We have been fortunate to evolve from solely an importer of small economy vehicles to a local producer offering vehicles in virtually every market segment. However, one thing that has not changed is our concern for the environment and our pursuit of advanced environmental technology. Our company's Guiding Principles and Earth Charter serve as the fundamental management policy for all our operations. These principles reflect Toyota's commitment to providing clean, safe and innovative products, while respecting the environment and culture of the local communities in which we operate.

In the interest of time, I will focus my remarks on hybrids, diesels and fuel cells. To begin, let me state the obvious: if we want to eliminate reliance on petroleum, then we must develop alternative energy sources to power vehicles or dramatically reduce the energy used by current vehicles. Hydrogen fuel cells are an attractive long-term option because they can dramatically reduce the automobile's environmental footprint - provided the hydrogen can be produced in a clean and efficient way.

Toyota began investing in fuel cell research and development in 1992. Our latest vehicle - the Fuel Cell Hybrid Vehicle or FCHV– has

a range of up to 180 miles and a top speed of 96 miles per hour. Fuel is supplied in the form of high-pressure gaseous hydrogen. We currently have 12 vehicles in operation here in the US and another 11 in Japan. As it's name implies, the FCHV utilizes hybrid technology to achieve even greater efficiency than a typical fuel cell. I will discus hybrid technology more in a few minutes.

Key challenges remain before fuel cells can enter the mainstream market. Some of these challenges, such as fuel cell stack efficiency improvements, system reliability, and so forth, can be solved – in time – through engineering. On the other hand, more fundamental scientific breakthroughs are needed to address on-board hydrogen storage – the critical factor in determining vehicle driving range. While Toyota and many others are working hard to find breakthroughs, no clear solution is in sight.

Even if automakers eventually develop a product that meets customer expectations at reasonable cost, significant challenges remain on fueling and infrastructure. As automakers there is only so much we can do in this area. Energy suppliers and governments must take the lead - in collaboration with the auto industry - in order to solve these issues.

Because they do offer such promise, Toyota is working hard to develop fuel cells, but we are not certain exactly when the scientific, engineering and production challenges will be solved. We expect to see expanded fleet use by the end of this decade and perhaps limited commercial introduction in the next decade. But as with any

technology, whether and how quickly the market accepts fuel cells will depend on our being able to meet customer expectations at a reasonable cost compared to other available alternatives. And as I will describe, those alternatives are improving as well.

One alternative that has garnered a lot of attention recently is diesel engines. No doubt, diesels have advanced rapidly over the past decade by using high-pressure common rail fuel injection, turbocharging, and other advances. And because diesels have higher thermal efficiency than gasoline engines they use less fuel energy per mile. In Europe, diesels now account for about half of new vehicle sales. But, there are several key differences between the US and European markets.

First, fuel prices in Europe are much higher and tax policies provide a significant price advantage for diesel fuel, while in the US diesel is more expensive than unleaded regular and in some areas more expensive than unleaded premium. In addition, diesel fuel quality, such as cetane level and aromatics content, is better in Europe.

Second, and more importantly, European diesel emission standards are less stringent than gasoline emission standards. In the US, both diesel and gasoline vehicles are required to meet the same standards. Further, the US standards are more stringent overall compared to Europe. The result is that diesels in Europe do not require the same level of emissions control technology and associated costs that diesels in the US would require.

But, whether diesels can meet US emission standards remains to be seen. For example, a Corolla-sized vehicle equipped with Toyota's advanced D-CAT diesel catalyst designed for Europe appears to meet EPA Tier 2 Bin 5 emission levels when new. Tier 2 Bin 5 is the level the average new car and truck must meet in 2007. However, our analysis indicates catalyst performance degrades over time, even with ultra-low sulfur diesel fuel, causing emissions to more than double from the US Tier 2 Bin 5 level to the Tier 2 Bin 7 level after 125,000 miles of operation. Besides meeting the basic emission standards, vehicles must also meet requirements under various conditions such as high-altitude, high speed, and cold temperature. These present additional cost and technical challenges.

Given the added cost of emission control hardware, the lack of diesel fuel price advantage, uncertain customer demand for diesels and - most of all - the challenge of meeting emission standards, the prospect for widespread use of diesels in the US remains unclear. One thing that is clear - we should not trade off public health for energy savings, especially when hybrid technology offers the potential to accomplish both.

As you know Toyota is aggressively pursuing hybrid technology because it can provide increased fuel economy, reduced fuel consumption, cleaner emissions and improved vehicle performance without changes in the fueling infrastructure. Hybrids combine an internal combustion engine with an electric motor and battery. There are several types of hybrids and their differences are important in terms of cost, performance and environmental benefit. The Toyota

Hybrid Synergy Drive (HSD) that we market in the US is a "full" or "strong" hybrid meaning that power is supplied by either the electric motor, the gasoline engine, or a combination of the two. The ability to operate solely on the electric motor is a unique feature of a full hybrid system and is key to achieving exceptional fuel economy. In addition, braking energy is captured and used to recharge the battery – and they never need to be plugged in.

Since we first introduced the Toyota Prius in Japan in late 1997, we have made substantial improvements. The first-generation Prius was a subcompact car EPA-rated at about 42 miles per gallon that met Low Emission Vehicle requirements. Acceleration from 0-60 miles per hour was an unspectacular 14.5 seconds. With each subsequent generation, we have increased the size, performance and fuel economy while lowering tailpipe emissions. The current Prius is a midsize sedan with an EPA-rated fuel economy of 55 miles per gallon - and it goes from 0-60 in just over 10 seconds. Compared to the average midsize car, Prius saves about 350 gallons of gasoline per year. Today's Prius meets Tier 2 Bin 3 emission levels - making it about 50 percent cleaner for smog-forming emissions than the Tier 2 Bin 5 level. A major reason Toyota has focused on gasoline hybrids rather than diesel for the US market is that hybrids provide fuel savings benefits plus there is no question about meeting and even exceeding existing US emissions standards.

And the market has begun to react – sales in 2005 alone equaled the total sales for the previous 4 years. However, despite the relative

success, total hybrid sales in the US still represent just over 1 percent of new vehicle sales.

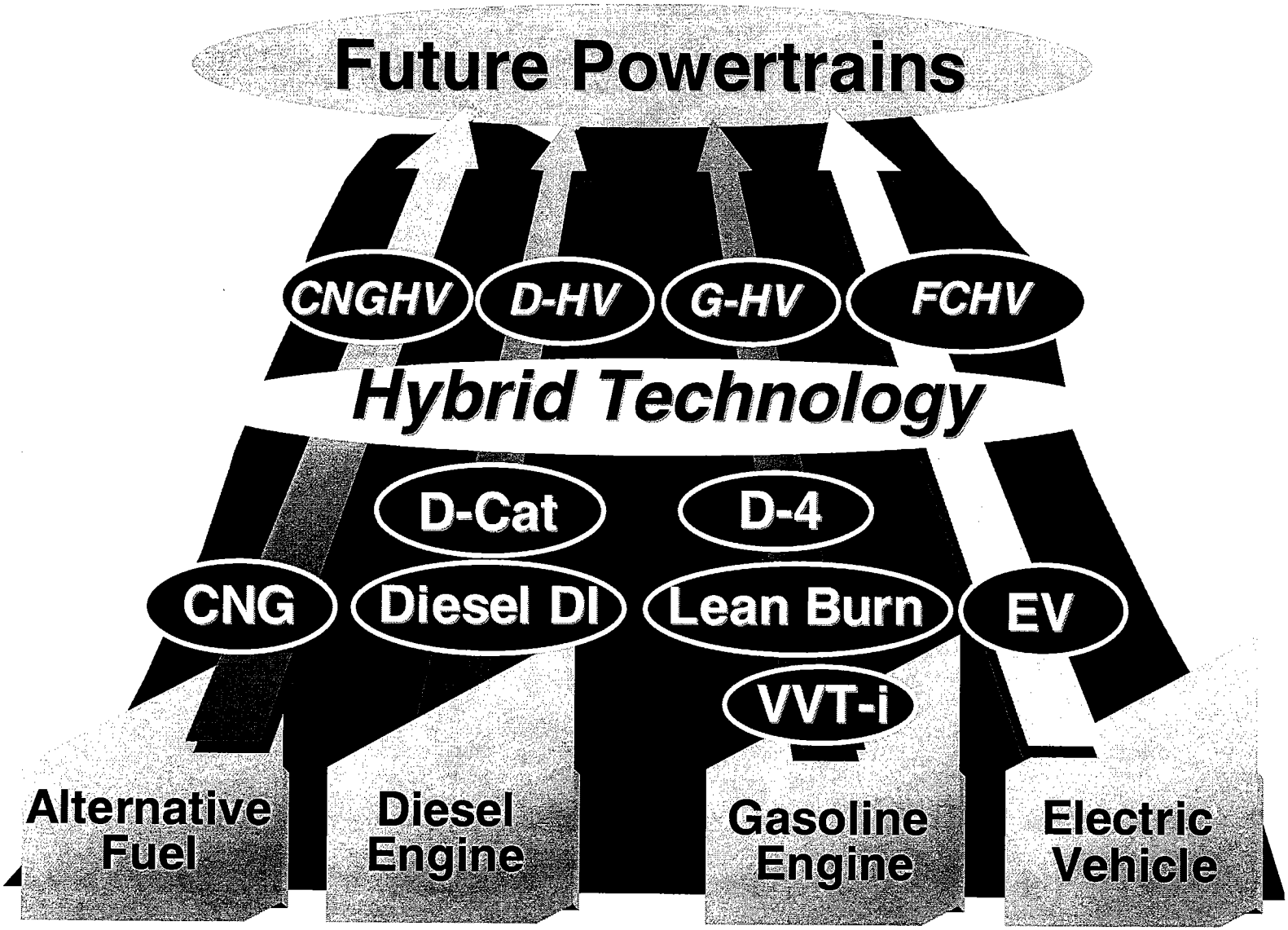
Earlier this year we introduced two new hybrids. In April we launched the Lexus RX400h SUV -followed in June by the Toyota Highlander Hybrid SUV.

The all-wheel-drive Lexus RX400h combines a 208 horsepower V-6 engine with front and rear electric motors to produce an overall peak of 268 horsepower. The result is a V-6 SUV with acceleration on par with competing V-8 models, yet with an EPA-rated combined fuel economy of 28 miles per gallon – about the same as the average compact car. The RX400h saves about 350-450 gallons of gasoline per year compared to comparable luxury SUV's. Further, it is certified to Tier 2 Bin 3 emission standards just like Prius. The Toyota Highlander Hybrid is available in either 2 or 4 wheel drive and has similar environmental performance.

We envision a day when consumers can choose a hybrid powertrain option on any vehicle just like they currently choose between 4-cylinder, 6-cylinder and 8-cylinder conventional engines. To that end, we recently announced the upcoming introduction of two new models – the Lexus GS450h luxury sports sedan and the Toyota Camry Hybrid, which will be our first hybrid produced here in the US - at our Georgetown, KY plant. We expect both of these vehicles to deliver superior fuel economy and improved performance.

The final point I want to make about hybrid technology concerns its applicability to a wide range of future powertrains, including fuel cells. Some view hybrids as a temporary measure to be replaced eventually by fuel cells. We view hybrids as an integral part of the future fuel cell. The only fundamental difference between our current gasoline hybrid system and our FCHV system is that the fuel cell stack replaces the gasoline engine. The hybrid portion of the system remains effectively unchanged. So the battery and control system improvements, production experience and cost reductions we are able to achieve with gasoline hybrids will have direct applicability in the future when fuel cells emerge.

In summary, we view hybrids as a core technology as we pursue sustainable transportation. The reality is that various types of powertrains and fuels are likely to be needed to address energy issues and public health concerns. Which technologies eventually win-out will depend on meeting customer expectations at a reasonable cost and on local market and regulatory conditions.

This concludes my remarks. Thank you for your attention.

Toyota Development Approach