On behalf of the National Asphalt Pavement Association and its 1,200 member companies, the association would like to thank Chairman Wu and Ranking Member Gingrey for holding this hearing to examine ways to reduce energy costs and environmental impacts through improved pavement technologies. I am Mike Acott, President of NAPA. Joining me to present testimony in response to the American Concrete Pavement Association (ACPA) testimony before the Subcommittee is Dr. David Newcomb, Vice President for Research & Technology.

NAPA represents asphalt pavement producers and related industries at the national level. Asphalt pavement material is composed of approximately 5 percent asphalt cement and 95 percent stone, sand or gravel. Of the 2.6 million miles of paved roads in the United States, over 94 percent are surfaced with asphalt. Approximately 85 percent of the nation’s airfield pavements and 85 percent of the parking lots are also surfaced with asphalt pavement. There are approximately 4,000 asphalt plants located in the United States producing annually 500 million tons of asphalt pavement material and employing directly or indirectly 300,000 U.S. workers.

NAPA has a long history in developing and promoting innovations that improve sustainability, energy efficiency, and virtually every other aspect of asphalt. Today, the industry produces a sustainable, environmentally friendly material that is adaptable to different climates, traffic loads, and end-use applications.
Moreover, asphalt pavement is America’s most recycled product. Each year, about 100 million tons are reclaimed, and 95 percent of that total is reused or recycled. NAPA has supported an active research program designed to answer questions about environmental issues and to improve the quality of asphalt pavements and paving techniques used in the construction of roads, streets, parking lots, airports, and other facilities.

The asphalt industry has been engaged with product improvement through technological innovation for many years. In 1986, the industry founded the National Center for Asphalt Technology (NCAT) at Auburn University, Alabama, by means of a $10,000,000 endowment from companies and individuals in the asphalt industry. Today NCAT is at the forefront of technological breakthroughs that are of benefit to contractors, agencies, and taxpayers. Its current operating budget is about $5,000,000 annually, mostly through research funding.

The NAPA Committee on Asphalt Research and Technology (CART) was formed in 1996 to provide a forum for industry-identified research topics to be discussed and put forward for funding.

Recently, CART partnered with the Federal Highway Administration (FHWA) to produce the National Asphalt Roadmap for Research and Technology. The asphalt industry’s research agenda is embodied in this document. In addition to FHWA, the partners in developing the document included the Asphalt Institute (AI), the American Association of State Highway and Transportation Officials (AASHTO), and the National Stone, Sand, and Gravel Association (NSSGA). This is considered to be a living document, and already many of the research projects identified within it have been approved for funding by FHWA and the National Cooperative Highway Research Program. The asphalt pavement industry would like to see continued vigorous federal research programs to address the issues that have been identified within the National Asphalt Roadmap.

As requested by the Subcommittee, NAPA’s testimony will answer the following questions:

1. How can paving materials contribute to energy efficiency and sustainability in the transportation sector?

2. What are the technical challenges and what ongoing or future research and development projects will improve the sustainability of pavement materials and address these challenges?

3. What actions can the federal and state and local governments take to overcome these impediments? What is the role for industry and academia, especially in technology transfer?

NAPA would also take the opportunity at the end of this statement to respond to testimony by Mr. Gerald Voigt of the American Concrete Pavement Association.
Mr. Voigt makes several assertions about asphalt pavement materials and technology. This testimony aims to provide constructive criticism of Mr. Voigt’s testimony and clarify the record in an objective fashion.

1. How can paving materials contribute to energy efficiency and sustainability in the transportation sector?

2. What are the technical challenges and what ongoing or future research and development projects will improve the sustainability of pavement materials and address these challenges?

With over 94 percent of paved roads in the United States surfaced with asphalt, even relatively small but widely applicable advances in asphalt pavement technologies could contribute greatly to energy efficiency and sustainability. Examples of such advances include Superpave and stone-matrix asphalt.

As mentioned previously, the National Asphalt Roadmap for Research and Technology was published in 2007. The Roadmap is the result of a public-private partnership and encapsulates the shared vision to “Develop improved asphalt pavement technologies that ensure the continued delivery of safe and economical pavements to satisfy our Nation’s needs.”

In addition, consider the following:

**Recycling.** As already mentioned, the asphalt industry is America’s number one recycler. Recycling saves precious natural resources and reduces the carbon footprint of pavement construction. Of the 100 million tons of asphalt pavement reclaimed each year, about 75 million tons is mixed with virgin materials and incorporated into new asphalt pavement. This is called the *highest and best use* because the asphalt cement in the old pavement is reactivated, becoming part of the binder for the new pavement and replacing some of the virgin binder that would otherwise be required. Another 20 million tons of reclaimed asphalt pavement, or “RAP,” is reused in other ways in highway building. Aside from recycling its own product, the asphalt industry incorporates materials from other industries, including used tires, waste roofing shingles, glass, and many others, into high-quality pavements.

**Smooth Roads.** We know that smooth roads conserve energy and extend the life of pavements. Studies at a pavement test track in Nevada have shown that driving on smoother surfaces can reduce fuel consumption in the neighborhood of 4.5 to 5 percent compared to fuel consumption on a rough pavement. A 5 percent fuel saving is the equivalent of a $0.20 per gallon reduction in fuel costs, assuming that fuel costs $4.00 per gallon\(^2\). Experts also estimate that a 25 percent increase in smoothness can result in a 10 percent increase in the life of pavements. In other words, smooth roads conserve fuel, save money, and last longer.
Reducing Congestion. Highway work zones reduce the capacity of a road to handle traffic, especially during rush hours. Asphalt pavements can be designed so that they only need periodic resurfacing, and the work to accomplish this can be scheduled during non-rush hours, facilitating the movement of vehicles through the work zone, reducing fuel consumption, and improving safety. Since asphalt does not need to cure in order to have the strength to support traffic, new or newly rehabilitated pavements can be opened to traffic as soon as they have been compacted and cooled.

Safety. Open-graded asphalt surfacings are widely used on highways to enhance safety. Ensuring the safety of our highways is always a top priority with agencies and contractors alike. Using porous friction courses on pavement surfaces helps to eliminate tire splash and spray in rainstorms. Not only does this enhance tire-to-pavement contact, and therefore safety, it also improves drivers’ visibility. In a high-accident area in Texas, replacement of a typical non-porous surface with porous friction course reduced wet weather accidents by 93 percent and reduced fatalities by 86 percent.

Porous Asphalt Pavement. The same open-graded pavement type that is used to surface highways can also be used in porous asphalt pavement systems for storm water management. Placing a porous asphalt pavement on top of a recharge bed allows storm water to percolate through the pavement surface into the recharge bed, where it is stored until it can infiltrate into the soil. Porous asphalt pavements decrease runoff and increase filtration, improving water quality. A porous pavement parking system tested at the University of New Hampshire Stormwater Center exceeded 95 percent removal efficiency for total suspended solids. In addition, a recent study by the Texas Department of Transportation found a 90 percent reduction in total suspended solids by using a porous asphalt surface on a highway pavement.

Open-graded and porous pavements hold great promise for water quality improvement. To date, a successful concrete open-graded surfacing material for high-speed pavements has not been developed because concrete’s brittleness causes it to crack and ravel under traffic. Porous asphalt pavements of both types – open-graded surfaces for highways, and porous pavement systems for stormwater management – have been used widely for over 20 years with an excellent record of success. We need research to better quantify the benefits of porous asphalt pavements and to better design these environmentally friendly pavements.

Quiet Pavements. As developable real estate becomes increasingly scarce in the urban and suburban landscape, more residents find themselves in closer proximity to high-speed highways and their noise. A major component of that noise is generated at the tire-pavement interface. Many times, very expensive noise walls are constructed between the development and the highway. Often times these walls cost as much as $50,000 per affected household. However, such noise walls have very limited effectiveness in reducing noise from the roadway, especially for residents living farther away. Using a low-noise asphalt
surface means that the volume can be turned down at the source, and that noise walls can be reduced in height. For every 1 decibel reduction, the noise wall can be reduced by 3 feet. If one considers all the miles of urban roadways in the U.S., the savings could be in the hundreds of millions dollars or more. It has been shown that asphalt pavements in the U.S. are quieter than concrete, anywhere from 1 to 10 decibels. This reduction in noise is of great importance to those residents’ quality of life. It is an important societal and budgetary issue that researchers continue to find ways to mitigate roadway noise through better surfacing materials.

**Rubblization.** When confronted with reconstruction or major rehabilitation of a concrete pavement, rubblization in-place of the concrete with an asphalt overlay is the easiest, lowest cost, and most effective way to rehabilitate the pavement in the shortest amount of time. The state of Arkansas estimated that it saved $1.3 million per mile on rubblization projects totaling over 318 miles as compared to removing and replacing the existing concrete pavement. However, rubblization’s benefits go beyond just the considerable money saved in construction; it also saves time and money for road users because they spend less time in traffic during the rehabilitation of the road. Spending less time in traffic means that vehicles produce a lower level of excess emissions. In addition, rubblization conserves stone by reusing the old concrete roadbed as the new road’s base. Because the old roadbed does not have to be hauled away, and new material trucked in, further fuel savings and emission reductions are realized.

**Perpetual Pavement.** Advancements in milling, recycling, and asphalt pavement technology over the last few decades have created asphalt pavements that perform better, longer, and at lower life-cycle cost than was previously possible. Today’s asphalt pavements can be designed literally to last in perpetuity. Total pavement reconstruction is rendered virtually obsolete with a perpetual asphalt pavement. Instead, the asphalt pavement is engineered and built to last without requiring major structural rehabilitation or reconstruction, and needing only periodic surface renewal in response to distresses confined to the top of the pavement. Perpetual pavement is environmentally friendly because it is extremely long-lasting. When the surface is renewed, the material that is removed is recycled. Perpetual pavement is also budget-friendly and has a lower life-cycle cost than conventional asphalt or concrete pavements.

**Warm-mix Asphalt Technologies.** The asphalt industry is keenly interested in processes that improve its energy efficiency and environmental friendliness. In addition to recycling, the industry is working on a new set of technologies to reduce the production temperature of its material. Known as warm-mix asphalt, these technologies reduce emissions and lower energy consumption. They also offer the potential for better performance and an extended paving season. Continued research and demonstration projects will be required to assist in the full implementation of warm-mix asphalt.
**Automation of Construction Practices.** Another facet of research needed is in the automation of construction practices. Such improvements may improve not only efficiency, but also worker safety at plants and in the roadway work zones. Gains in efficiency would translate into less fuel consumption and lower production of greenhouse gas emissions. NAPA is very supportive of national efforts such as the development of intelligent compaction, automated sampling and testing, and other tools to enhance worker safety.

3. What actions can the federal and state and local governments take to overcome these impediments? What is the role for industry and academia, especially in technology transfer?

The planning, design, construction, and operation of highways have changed dramatically and will continue to evolve. Historically, state departments of transportation, in cooperation with the Federal Highway Administration, have been the public-sector leaders in defining contracting procedures, material specifications, and construction specifications. The procedures of state Departments of Transportation (DOTs) are often adopted by county and local governments and in many cases are also used in private construction activities.

Many changes have occurred in the technology associated with asphalt pavements over the last 50 years. These changes have led to the continuous improvement of asphalt pavements through new products, analytical tools, and testing procedures.

As many of our nation’s highways and bridges exceed their design life, they will require significant improvements. An ongoing research and technology program aimed at continuous improvement in the performance of asphalt pavements is vital to the national interests.

**Federal Research Program.** Significant progress in asphalt pavements can only be achieved through a federally led, nationally coordinated research and implementation effort. In addition, an inclusive, well-coordinated national effort is necessary to foster a strong legacy of technological advancement in asphalt pavement knowledge. A focused program for asphalt research should be based on broad intellectual competition, should be of substantial breadth and depth, and should be directed by a consensus of stakeholders.

As members of this Subcommittee know, research also leads to a better educated workforce. There is an ongoing need for hiring and retaining engineers and technicians to design and analyze asphalt pavements. The training of professors, engineers, and technicians is facilitated by research.

Within the next 30 years, improved asphalt pavement technologies must be developed to ensure the continued delivery of safe, environmentally sustainable, economical pavements that satisfy our nation’s needs.
As previously stated, with over 94 percent of the roads and highways in the United States surfaced with asphalt, even relatively small but widely applicable advances in asphalt technologies through a robust research and technology program could save many more millions of dollars, enhance sustainability, and result in a pavement infrastructure system that serves the nation’s economy and citizens in the years ahead.

NAPA respectfully urges the Committee on Science and Technology to reauthorize the existing asphalt research program under the Federal-aid Highway Program and increase the funding to achieve the vision as outlined in the National Asphalt Roadmap for Research and Technology. A strong federal partner with adequate funding will foster asphalt pavement research and implementation as outlined in the Roadmap, resulting in a more sustainable, environmentally friendly pavement.

Response to the American Concrete Pavement Association (ACPA) Statements by David E. Newcomb, Ph.D., P.E.

As the Subcommittee considers these important issues and prepares for the next transportation authorization bill, NAPA would like to respond to portions of Mr. Voigt’s testimony to the Subcommittee.

ACPA’s Assertions

“One of the unique distinguishing features of concrete pavements is their well-documented longevity compared to asphalt pavements. Most pavements are placed with a targeted design life of 20 years, but in reality concrete pavements generally last much longer, while asphalt pavements last less than 20 years.” (ACPA Testimony, Page 1)

“It is the exceptional longevity of concrete pavement that is primarily responsible for its enhanced sustainability, as the lack of frequent repair and replacement results in reduced congestion; fewer construction cycles (and the associated energy consumption, pollution generation, and use of natural resources); and enhanced safety through surface characteristics.” (Page 1)

Factual Response

Studies from Kansas, Oregon, Washington, Ohio, and Minnesota all show that asphalt pavements last as long as or longer than concrete pavements. In Oregon, the average age of concrete pavements on the interstates is about 30 years, the oldest being about 50 years. Asphalt pavements on interstate routes in Oregon are, on average, about 40 years old, with the oldest pavements being between 50 and 60 years old. In Washington, the asphalt pavements average an age between 35 and 40 years, with the oldest being about 50 years, and concrete pavements’ average age is about 35 years with the oldest being about 50 years.
What is more, the studies from Kansas\textsuperscript{10} and Ohio\textsuperscript{11} show that asphalt pavements have a lower cost over their lives than do concrete pavements. Decades ago, using technology available at the time, an asphalt pavement would generally last 12 to 18 years before the first overlay was needed. Recent improvements brought about by better technology have been credited with extending the time to the first resurfacing of an asphalt pavement to over 20 years. And, unlike with concrete, resurfacing an asphalt pavement can be done when traffic levels are at their lowest and the road can be turned back to traffic during rush hours. This enhances safety and convenience to the traveling public by minimizing delays for motorists.

In addition, many asphalt pavements built decades ago are functioning as perpetual pavements. As mentioned above, perpetual pavements are designed so that the pavement structure will last in perpetuity. Total pavement reconstruction is rendered virtually obsolete. Instead, the asphalt pavement is engineered so that distresses are confined to the top layer of the pavement. At infrequent intervals, the surface is removed for recycling, and replaced with a smooth, safe new surface. The Asphalt Pavement Alliance has awarded its Perpetual Pavement Award to over 27 agencies since 2001. In order to qualify for this award, the agency must submit documentation showing that the pavement has lasted more than 35 years with no structural failure. These sustainable pavements use fewer resources and have a lower lifetime cost than conventional pavements.

\textbf{ACPA’s Assertion}

\begin{quote}
“Concrete is 100 percent recyclable and reusable.” (Page 2)
\end{quote}

\textbf{Factual Response}

Industry experts question how much concrete pavement is actually recycled back into concrete. Asphalt pavement can be recycled back into a new product because the aggregate and binder are still viable to play their role in the new mixture. In the parlance of recyclers, this is the \textit{highest and best use} of the reclaimed product. With Portland cement, however, the binder cannot be rehydrated after its initial use. Therefore, once the steel reinforcing material is extracted from reclaimed concrete, it is a low-value material which can be used only as aggregate in limited applications.

\textbf{ACPA’s Assertions}

\begin{quote}
“Of the two types of highway pavements—asphalt and concrete—concrete pavements inherently have the lowest overall energy footprint. The reasons for this are many, but the primary factors are the exceptional longevity of concrete pavements, the relatively low amounts of fuel required to place concrete pavements, and, of course, the fact that our
product is not a byproduct of petroleum refining and production and thus has a much lower embodied primary (including feedstock) energy.” (Page 1)

“The energy and sustainability benefits of hardened concrete used in transportation infrastructure overcome any drawbacks from the energy intensive manufacture of this one component [Portland cement].” (Page 2)

**Factual Response**

The study cited by the concrete industry was performed by the Athena Institute and sponsored by the Cement Association of Canada. The asphalt industry’s response to these assertions is based on the environmental performance tool provided by the National Institute of Standards and Technology (NIST).12

The concrete industry’s study omits the energy consumed and the carbon dioxide emitted during production of Portland cement. For a life-cycle analysis of a construction material to be meaningful, however, it must include all aspects of production, construction, and disposal (or reuse/recycling) at the end of the material’s useful life.

The NIST tool is based on an extensive analysis of total life-cycle energy requirements and CO₂ emissions associated with different pavement types and designs. This analysis has been vetted at the highest public levels and EPA supports its use through the Environmentally Preferable Purchasing (EPP) Program, which is charged with carrying out Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management.

The NIST environmental performance tool should be considered as the gold standard for comparisons of true life-cycle energy consumption, greenhouse gas emissions, and any other environmental factors. Using the NIST software to compare different pavement types, there is little doubt about the environmentally superior life-cycle performance of asphalt pavements as compared to concrete.

Very little energy is required to produce asphalt, as a refinery typically expends energy to obtain products like gasoline, fuels, and lubricants; in some refineries, asphalt is the product remaining after all others have been extracted. However, the Department of Energy’s Energy Information Administration (EIA) assigns energy consumption values to the production of asphalt, and these are very low. According to the EIA, all carbon in asphalt is considered “sequestered.”13 In fact, due to the perpetual ability to reclaim and reuse asphalt pavement, the carbon (and energy) embodied in asphalt will likely remain sequestered indefinitely.

Asphalt pavements contribute to an energy-conscious environment in many other ways as well. Because asphalt pavements are faster to construct and rehabilitate, construction work can be accomplished during off-peak hours, reducing traffic construction congestion and commensurately reducing use of fuel and production of emissions. Because a new or newly rehabilitated asphalt
pavement can be opened to traffic as soon as it has been compacted and cooled, there is no question of waiting for days or weeks, with traffic being detoured or squeezed into fewer lanes, for the material to cure. Technologies such as rubblization of concrete pavement with an asphalt overlay save energy because the rubblized pavement does not need to be hauled away, new base material does not need to be trucked in, and landfill space is saved. In addition, the need for mining and processing of virgin materials is reduced.

ACPA’s Assertions

“With regard to energy consumption, there are a host of energy-related factors that are not considered in the typical pavement type selection process in use presently by state transportation departments. Primary among them is the energy required to build pavements and the energy consumed by vehicles to drive on pavements once they are opened to traffic.” (Page 3)

“According to the Federal Highway Administration’s Technical Advisory on Price Adjustment Contract Provisions, construction of hot-mix asphalt roadways consumes more than five times as much diesel fuel as the construction of comparable concrete roadways.” (Page 3)

Factual Response

The fuel consumption statistics for pavement construction that are cited by ACPA are based upon a 1980 FHWA Technical Advisory that was intended to provide price adjustment indices for fuel consumption during the energy crisis of the late 1970s. It was based on data from a 1974 Transportation Research Board Circular. This information only covers part of the energy consumption and does not take into account raw material acquisition such as aggregate, cement, and asphalt. It also does not account for the energy or environmental cost to clear land, transport mobile concrete plant components, erect the plant, dismantle it, and restore the land.

ACPA’s Assertion

“Considering the associated reduction of carbon dioxide by constructing only concrete pavements, this would be equivalent to taking 2.7 million cars off the road annually.” (Page 3)

Factual Response

In a side-by-side life-cycle analysis, using the environmental performance software from the National Institute for Standards and Technology, the amount of CO₂ emissions associated with constructing and maintaining a 50-year life cycle
of an asphalt pavement is only about 30 percent of that associated with a concrete pavement.\textsuperscript{14}

ACPA’s Assertion

“The National Highway System is the primary system for the delivery of goods by truck in the U.S. Some 80 percent of U.S. communities can be accessed only by truck for deliveries. The system presently consists of approximately 160,000 lineal miles of pavement, 59 percent of which has an asphalt surface. If these asphalt surfaces were converted to concrete surfaces, it would save 2.1 billion gallons of diesel fuel per year at the pump (an $8.2 billion dollar annual savings at $4.00/gallon), reduce our dependence on oil, lower the emissions from vehicles, and decrease the cost of transporting goods.” (Page 3)

Factual Response

The National Highway System is critically important to the nation’s economy, defense, and mobility. Converting the NHS to concrete would cripple the United States. The evidence is clear that we have grossly underfunded the maintenance of our highway and bridge systems over the last three decades. The annual investment required by all levels of government to bring the nation’s highways and bridges up to a state of good repair must grow from $78 billion currently to $185 billion annually, according to the National Surface Transportation Policy and Revenue Study Commission. The huge financial commitment needed to convert asphalt pavements to concrete pavements would cost well beyond the estimated expense to simply maintain the existing infrastructure cited by the Commission and further worsen the fiscal condition of the Highway Trust Fund, which is already on the verge of collapse.

In addition to the huge financial commitment, highway users would face extraordinary delays and the energy costs would be gargantuan as these pavements were converted from asphalt to concrete. Americans annually lose a total of 4.2 billion hours in traffic congestion, wasting 2.9 billion gallons of fuel and costing the economy $78.2 billion in lost productivity. The impact to the nation’s economy and global competitiveness would be huge as these critical lanes are shut down for the purpose of converting pavements from asphalt to concrete.

The concrete industry has cited a Canadian study as showing that concrete pavements provide better fuel efficiency for larger trucks. This study, funded by the Portland cement industry in Canada, has several flaws which are noted in the report, but not mentioned by the ACPA. For instance, the researchers noted that the variability of the data was too great to show conclusive differences. Also, the asphalt pavement studied was considerably rougher than the concrete pavements.
In the end, the Canadian study proved what had already been shown in studies such as the one conducted in Nevada, that pavement roughness, not pavement type, is responsible for differences in fuel mileage. The Nevada study concluded that trucks running on a smooth pavement could save 4.5 percent on fuel consumption. Smoother pavements also result in longer pavement life by as much as 10 to 25 percent, resulting in lower maintenance costs. As a rule, asphalt pavements are smoother than concrete pavements. Smoothness measurements on interstate highways in Oregon and Washington showed that asphalt pavements are on average 33 percent smoother in Oregon, and over 50 percent smoother in Washington. Smoothness also means that truck tires don't bounce on the pavement and deliver the kind of impact loading they would on a rougher pavement. Some experts estimate that increasing pavement smoothness by 25 percent results in a 9 percent to 10 percent increase in the life of pavements. Long life contributes to asphalt's sustainability.

**ACPA’s Assertion**

"Concrete pavements have a direct effect on mitigating urban heat island effects. Urban areas can be up to nine degrees Fahrenheit warmer than surrounding areas, related to among other things heat-absorbing dark-colored horizontal surfaces like roofs, roadways and parking areas, which translates to more pollution and more energy required for cooling buildings. Concrete has been used successfully, along with other light colored building materials and strategic planting, to reduce the urban heat island effect. According to work done in 2005 at Lawrence Berkeley Laboratories, the potential energy savings in the United States from this type of planned mitigation is estimated at $5 billion per year through reduced cooling costs. At this time urban heat island is not a factor used in the selection of pavements by FHWA or state transportation departments.”

Urban heat island mitigation is not a black and white issue. According to the United States Environmental Protection Agency, “there is no official standard or labeling program to designate cool paving materials, and research in this area is in an early stage. While studies show that pavements can affect the urban heat island and resulting air quality, results are complicated by several factors. These include the impact of shadows from nearby structures; changes in pavement characteristics over time; and the absorption by buildings of solar radiation reflected from the pavement surface.”

Density, heat capacity, thickness, porosity, and a myriad of other factors affect pavement surface temperature as well. In 2005, the co-directors of the National Center of Excellence: SMART Innovations for Urban Climate and Energy, published an article in Public Works magazine emphasizing that factors other than pavement color play a large role in urban heat island mitigation. EPA sponsors and looks to the National Center as leaders in this area. Not
specifically mentioned in the *Public Works* article, but clearly identified in the satellite image provided with the article, the hottest surface temperature signature in Phoenix is the airport with its 23-inch-thick concrete runways. In the same article, the authors point out that open-graded asphalt pavement surfaces placed on top of concrete freeways are highly successful in reducing pavement surface temperature. EPA also recognizes that "[p]orous, or permeable, pavements benefit from the cooling effect of evaporation." In addition, open-graded pavement systems have been shown to reduce the amount of pollutant loads.

**ACPA Assertions**

"Current institutional and technical challenges exist that impede a more widespread use of sustainable and energy efficient pavements. It is our contention that significant improvements could be achieved simply by including consideration of these important factors in the selection process used for pavements. At present, most decisions are based on first cost, and to a limited degree life-cycle cost. However, factors such as user costs, the energy required to build and operate pavements, as well as the energy consumed by vehicles driving on pavement surfaces or used for lighting roadways, is not appropriately considered. New, more comprehensive selection processes could take these real agency and societal impacts into consideration. A stronger federal position on the use of federal-aid funds coupled with an objective and more comprehensive federal pavement selection policy would help insure that states and other agencies effectively apply appropriate considerations for energy use and sustainability.” (Page 6)

"The culture of considering "lowest first cost" in place by most state Departments of Transportation (DOT's) must change to impact the use of innovative and current materials that are more sustainable. Traditionally, state departments of transportation have considered the construction and maintenance of a roadway as two separate operations, with separate funding levels assigned to each. Some states have adopted life-cycle cost strategies for some of their pavements, in which both the initial construction costs and long-term maintenance and operation costs are included as a way of comparing alternate pavement designs for a section, but this has not pervaded all of their decisions. An asset management and sustainability strategy can only truly be reached when an agency applies this mindset both simultaneously across their roadway network and continuously throughout time. In doing so, the pavement network is viewed as an asset and a mix of different rehabilitation strategies are employed to sustain its value.” (Page 6)

**NAPA’s view** is that state DOTs do an outstanding job of providing the best possible infrastructure for local conditions, and the asphalt industry wholeheartedly supports them. It is our strong opinion that a federal pavement selection policy is not a prudent way to approach sustainability. The challenges
faced by agencies throughout the U.S. demands that those administrators have the autonomy to choose the paving material that best suits their needs.

Legislating one standard for dissimilar environments removes the flexibility necessary to build the most environmentally and economically sustainable, highest-performing, safest roads. It is our opinion that Congress and the federal government should not dictate pavement selection.

Further, we are not sure that ACPA’s assertion that “the culture of considering ‘lowest first cost’” exists. This statement is a negative reflection on the professionalism of DOTs with which we do not agree. The DOTs are assembling factual information so that they can perform life-cycle cost analysis. NAPA supports the use of life-cycle cost analysis based on factual information.

NAPA’s position is that local conditions require the existing oversight of the state and local governments to remain in place. The asphalt pavement industry is proud to be a partner of the state DOTs, the American Association of State Highway and Transportation Officials (AASHTO), and the Federal Highway Administration (FHWA) in these agencies’ quest for continuing improvement in providing pavements that meet the nation’s needs.

Thank you for your time and attention. NAPA appreciates the opportunity to submit this testimony on these important issues and is available to discuss these issues further with the Subcommittee at your convenience.

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10 Cross, Steven A. and Robert L. Parsons, Evaluation of Expenditures on Rural Interstate Pavements in Kansas, Kansas University Transportation Center, University of Kansas, Lawrence, Kansas, February, 2002.


12 Building for Environmental and Economic Sustainability; National Institute of Standards and Technology; (http://www.bfrl.nist.gov/oaef/software/bees/please/bees_please.html. Downloaded July 2, 2008.)


