7 July 2011

House Subcommittee on Energy and the Environment
Hearing: Hitting the Ethanol Blend Wall – Examining the Science on E15

Testimony of W. Steven Burke · President and CEO, Biofuels Center of North Carolina

Mr. Chairman and Committee members: I am Steven Burke, President and CEO of the Biofuels Center of North Carolina. A private non-profit corporation, the Center was established by the North Carolina Legislature in 2007 to implement a policy, economic, and agricultural imperative: to gain large internal capacity for alternatives to petroleum-based liquid fuels.

I have been asked not to provide technical responses about E15 but, instead, North Carolina's way of thinking and a way of doing about our biofuels future.

I briefly make, however, a simple statement about the E15 decision of the EPA. The Biofuels Center supports the decision as a necessary intermediate step on the road to larger and longer-term national goals. More time is clearly needed for advanced biofuels technologies to develop. In the interim, increased use of ethanol serves as the first stage foundation required for new biofuels technology, affirms biofuels within consumer and national life, and prepares for large amounts of next generation feedstocks, technology, and facilities.

For biofuels development in North Carolina, my requested topic, our way of thinking and doing is shaped by a strong premise: *America will continue to seek more augmentation of petroleum-based fuels and thus needs new models to gain large amounts of liquid fuel from sources other than corn in places other than the Midwest.*

North Carolina has shaped such a model, springing from an ambitious goal: *by 2017, 10% of the state's liquid transportation fuels will come from biofuels grown and produced internally.* By current usage estimates, up to 600M gallons will be required.

The goal is challenging but possible if a key recognition underlies policy and activities: development of large biofuels capacity must be seen as landscape changing, actually and figuratively, and as such must be judged nothing less than a societal and civic imperative.

Such thinking, both bold and common-sensical, shapes work of the Biofuels Center of North Carolina. Judged the nation's only agency working comprehensively over time for all aspects of biofuels development, it was established to meet the state goal and shape a 10-15 year civic endeavor statewide. The endeavor sprang from four compelling and strong imperatives:

1 · Smart places and leaders now must strategically address their energy future as crucial for their future success and daily survival.
2 · An enormous and feasible new sector, well dovetailed to a state strong in both agriculture and technology, will be created.
3 · Economic and societal gains will come across the state, largely in rural and agricultural counties most in need of economic advantage. Realistic opportunities for sustained rural gain are few and merit committed support.
4 · Job and economic enrichment will be as strong or stronger in existing areas – forestry, agriculture, logistics, and distribution – as in new production facilities.

Financial and policy support for North Carolina's biofuels endeavor is sustained, permanent within the budget even at a time of financial constraint, and consistently nonpartisan. Biofuels in North Carolina is judged a matter of thoughtful future-thinking policy and not of politics.

The Center is located on North Carolina's Biofuels Campus, in the Granville County town of Oxford. The 426-acre Campus is a former lead USDA Tobacco Research Station established in 1910 and turned over to the state in 2005. The movement from tobacco to biofuels nicely symbolizes evolutionary changes in state and national agriculture.

How does a single state create and implement the long-term, disciplined, and comprehensive framework required to create and maintain a complicated new sector? Our thinking is shaped under two headings:

- NORTH CAROLINA'S NATIONALLY UNIQUE BIOFUELS ENDEAVOR
- CONSIDERED THINKING ABOUT POLICIES, MANDATES, AND SUPPORT

NORTH CAROLINA'S NATIONALLY UNIQUE BIOFUELS ENDEAVOR

Shaped by the Biofuels Center of North Carolina, a statewide framework will over time strengthen resources, gain both feedstocks and production facilities, minimize risk and maximize gain to growers and investors, and address attendant financial, environmental, and policy issues.
Ten factors and recognitions shape North Carolina's approach to biofuels development:

1 · An Endeavor Not Based on Corn

By policy, North Carolina's state biofuels endeavor will not be based on or develop corn-derived ethanol. Judged an unusual determination when laid out in 2007, the decision has been proven sound. It grants realistically that the state does not efficiently produce corn and that large poultry and swine industries must not be disadvantaged.

As such, state policy must soon and strongly move to practical evidence that other feedstocks, both crop- and tree-based, can sustainably and economically support advanced cellulosic biofuels. While this

will make large commercial production unlikely in the short-term, it will yield strong advantage and good preparation for the longer-term as America moves to other feedstocks and more producing states.

2 · Biofuels Development is Technology Development

Biofuels must be seen and shaped as a *technology* – demanding and complicated, exploratory and entrepreneurial. Despite large production of ethanol in the mid-west and Brazil, the technology is new and unfolding, at an early stage comparable to main-frame computers. Such ethanol production displays the historical reality of technologies: they begin with what we know and can do, and inevitably evolve. Such evolution will in coming years yield new ways to make fuels from new sources in new places.

As with any new technology, gaining such new biofuels will take time, prove expensive, yield risks and setbacks, and necessarily require problem-solving. As technologies must, the imperative will engage our best thinking, arouse entrepreneurial imagination, trigger new governmental programs and policies, yield large economic return, force leadership, and make the place better. Although based on agriculture – the first technology around which societies formed – advanced biofuels are as technologically complex as the devices in our pockets. Failure to understand this complexity lessens the speed and effectiveness with which programs and funding move biofuels along the process of technology development, from societal need and research to outcome and change.

3 · The Endeavor is Agricultural

Human life has been shaped by dependency upon the land – for food, key materials, and energy. Although the last century was shaped by non-land based energy sources for most vehicular transportation, common sense and strategic reality now impel movement from total dependency on carbon-emitting, variably available, and politically destabilizing petroleum. Costly to America by many measures, that about-to-end-era freed the land unrealistically and only temporarily from its place in energy production.

Agriculture and the land are, so to speak, *back . . .* and indeed *strengthened . . .* for energy production. Both must provide expanding capacities to fuel our vehicles as well as our diets and materials for daily life. Responsible state biofuels programs grant that accommodating new feedstocks to land, in balance with both food uses and the environment, requires challenging new thinking and policies.

4 · A Comprehensive Approach is Required

North Carolina's approach to biofuels development is comprehensive, based on the recognition that piecemeal attention to resources and tasks yields uncertain success. A dovetailed framework of strategy and activities must integrate every aspect of biofuels, from societal policy to new fuels enthusiastically placed in vehicles.

The nation's only state-based agency constituted with a comprehensive mandate, the Center addresses over time: research, growing and agronomic analysis, pilot and large scale production, company development, distribution, land and land use, environmental and policy issues, and public preparation.

Specific requirements are varied: farmers and landowners must commit to new feedstocks and new uses of biomass; economic analyses must verify that money can be made in growing, production, and distribution; consequential issues must be addressed, for large impact will be seen on land, biodiversity, water, and the environment. Credibly addressing issues will in fact likely prove crucial in coming years to sustained growth of the biofuels sector; addressing them is a responsibility as well as the task of a life-based technology. Problems must be solved; models for sustainability must be crafted.

While few would argue that these are the tasks of biofuels development, no other federal or state models appear to purposefully identify, fund, and address them in a comprehensive framework. Encouraging such state and regional models can prove valuable to this Subcommittee and to federal agencies, as they will increasingly prove necessary for the success and survival of a national biofuels endeavor expanding in feedstocks, geography, and strategic importance.

5 · Sustained Commitment is Required

North Carolina grants that a long-term commitment is required. Technologies, a landscape changing sector, and visionary goals do not come about quickly or easily. As such, a sustained endeavor, over 15 plus years, will yield daunting tasks and developing groundwork in the short term but verifiable and large return in the long-term.

6 · The Endeavor is Civic in Scale and Responsibility

Biofuels both springs from and shapes many of the largest societal imperatives: science and technology, agriculture and growers, crops and forests, policy and strategy, public behaviors and car culture, land and land use, energy and comprehensive energy policy, economic gain, production and distribution, climate, verified and functional sustainability, and something of daily survival in a changing world. As such, biofuels is nothing less than a civic endeavor. Smart places, agencies, and policy leaders should include it among imperatives for deliberate civic attention. Synthesis among the imperatives is challenging but required. As with any civic and societal mandate, the key framing question is constant and large: *how can this endeavor make better our place and our future?*

7 · Production at Varying Scales is Sought

Biofuels, particularly biodiesel, can be produced at widely varying scales by widely varying producers. No other significant technology permits such variation from small to large, from local and civic sources to 100M gallons per year commercial facilities. Granting that biofuels can and should fully spring from every feedstock source and possible facility, North Carolina posits a future landscape peppered with sites varying in output and sources. Gains to municipalities, consortia, landfills, farmers, and landowners will augment large commercial gains. A balance of local and centralized biofuels production simultaneously serves strategy, common sense, and community economies.

8 · Feedstocks and Biomass Must be Sustainable

Sustainability of varied crop- and tree-based resources over time must be ensured, for the feedstock requirements and drawdown in coming years – particularly if petroleum is constrained more quickly than expected – will be enormous and unprecedented in North Carolina and beyond. Environmental,

agricultural, and economic imperatives must be simultaneously served and balanced. While farmers are accustomed at thinking in such terms, not all parties seeing gain from biofuels necessarily will be, particularly in the short-term.

9 · The Imperative is Unquestioned

Smart places and leaders understand now that gaining alternatives to petroleum-based fuels is not just desirable, not a luxury, and not just a useful addition to the agricultural sector. Biofuels are requisite for our future. Our best problem-solving and most targeted programs must be shaped to ensure their availability and benefit. More challenging yet, biofuels must be shaped within the full context of comprehensive energy policy, for in our era no source or new mandate can exist in isolation. Doing so proves challenging to states as to the federal government.

10 · Innovative Partnerships and Targeted Projects are Required

Creating enormous amounts of new fuels from more places with expanding agriculture and new technology is unlikely without new thinking and activities. In any place, goals must be matched with resources and activities and must fit a comprehensive framework. Four representative examples, each complex and large in ambition, are underway in North Carolina:

North Carolina's Biofuels Campus

The 426 acre Campus will be developed over the next ten years as the nation's only large site for:

1 · Trial growing and agronomic data for crops and trees, both indoors and in greenhouses.
2 · Company incubation and partnerships. A recently completed business accelerator, with lab renovation funded by the DOE, provides a setting for small company development.
3 · Pilot and demonstration facilities.
4 · Public education and multiparty convenings on the biofuels issues, financing, and technology.

Use of Swine Lagoon Sprayfields

North Carolina's large swine industry yields lagoons containing nitrogen and phosphorus. Excess liquid is routinely sprayed on 100,000 acres of prime fields currently growing low- yield and low-value Coastal Bermuda grass only to absorb and remediate these effluents. The Biofuels Center has trials underway to verify both environmental and economic benefits to instead grow cellulosic energy grasses: sorghums, switchgrass, miscanthus, and Arundo donax. Multiple commercial and proximal production facilities can be supported from the feedstocks; benefits will accrue nicely for both animal and crop agriculture as well as rural for regional economic gain.

Assessment of Wood Resources Statewide

North Carolina's 18M acres of forested land proves compelling to technology and production companies working for conversion of privately owned wood biomass, for the amount can balance both feedstock needs and sustainability over years. The Biofuels Center will soon complete analysis of wood resources statewide and of 14+ sites for production facilities. Doing so is necessary to enable production companies to economically sustain new wood-based technologies and justify large investment.

Project Eastern Gain
Home to the nation's third largest military presence, from all branches, North Carolina seeks to both strategically serve the military and to prevent encroachment on its bases. An ambitious project seeks by 2016 to gain up to 50M gallons of jet aviation fuel from new land use and new production facilities in rural counties contiguous to bases.

Considered Thinking about Policies, Mandates, and Support

Ultimately in our society, government policies, leadership at all levels, smart thinking, and best outcomes work for only two profound goals: societal improvement and survival.

As areas of societal improvement become larger in impact, more complex in implications, and change-inducing, governments assume inevitable responsibility to guide and trigger. Biofuels, as well as the larger imperative of sustainable energy of all types, should be judged necessarily worthy of governmental attention and mandate. For biofuels – as for any new endeavor, new technology, or new policy – the shaping of appropriate attention and mandate is challenging, evolving, and difficult.

To ensure national biofuels capabilities, federal agencies and some state governments have shaped programs, set goals, and committed funding. Doing so gives verification of need as well as impetus for new biofuels capabilities, resources, and policies – from science and technology to production facilities, consumer choices, and agricultural foundations. Important and complex societal outcomes seldom just happen anymore by fate and good intentions. Inducement, support, and nurturance are required. Leadership is necessary to induce change and gain.

For the federal government in particular, large in both responsibility and resources, two enormous key questions soon emerge around such attention to biofuels:

First, how is the *always* uneven balance between goals, public outcomes, and technology development addressed? Policies and questions around ethanol reveal this inevitable initial disjuncture. Moving to larger ethanol usage, as discussed in this hearing, moves national goals to quantifiable reality; doing so is always hard and always welcome. At the same time, the goal impels change to both industry and the public. The juncture of goals, new technology, and an existing industry is historically never smooth and biofuels development proves no exception.

As a result, the proposed assessment of effects of mid-level ethanol blends discussed today is neither surprising nor unwelcome. If quantifiable results and concerns reveal new needs or liabilities, the continual imperative of new technology development is simply at hand and affirmed: address and solve the problem. That is what technologies do as they find their place and merge with existing industries. Failure to do so with ethanol would surely be akin to truncating mobile phones development because they early dropped calls. Technologies always yield challenges and outcomes in equal measure. Economic, policy, industry, and public factors are always at play and must be balanced, with risk usually at hand if one vantage point is allowed to dominate decisions.

Second, how do we evaluate the cusp at which a new technology or sector, like any offspring, needs to be weaned of nurturance? The movement from necessary nurturance to ongoing subsidy seems often subtle and too-inevitable. A technology too-long subsidized is at best expensive as well harder to defend, and seems at worst the boutique captive of vested interests. No sector truly important to society, as is true of biofuels, can be seen fairly or not as supporting vested rather than societal interests. Current analyses of ethanol subsidies reveal the inevitability of addressing this cusp.

At the same time, other federal programs and mandates – for loan guarantees of production facilities, for verification of new technologies, for gaining of biomass, for production and use of ethanol – appropriately continue still-early nurturance of goals and infrastructure. However, they will necessarily evolve as a strengthened and expanding biofuels community nationwide moves to new needs in coming years.

W. Steven Burke
President and CEO
Biofuels Center of North Carolina
901 Hillsboro Street · PO Box 1919
Oxford, NC 27565 USA
Phone 919-693-3000 ext 261 · Fax 919-603-5600

www.ncbiofuelscenter.org · www.ncbiofuels.net

BIOGRAPHICAL INFORMATION
W. Steven Burke
President and CEO, Biofuels Center of North Carolina

Mr. Burke has served as president and CEO of the Biofuels Center of North Carolina since March of 2009. He served as founding board chair from July of 2007 until that date, and as acting president since August 2008.

The Biofuels Center is a private, non-profit corporation established by the State of North Carolina to implement a policy commitment to gain large capacity for growth and production of biofuels. The Center is judged the nation's only agency working within a long-term and comprehensive framework for all aspects of biofuels development.

Mr. Burke serves on the Executive Committee of the Biofuels Center. He is a member of the State of North Carolina's Energy Policy Council; a board member of the Bent Creek Institute; and Vice Chair of the board of directors of the Biotechnology Institute, a non-profit corporation working for strengthened biotechnology education nationwide. From 2001-2009, he served as founding board chair and board member of the Institute of Forest Biotechnology, a private non-profit corporation addressing the scientific, industry, and societal issues of forest biotechnology worldwide. He served two terms—in 1995-96 and 1997-98—as chair of the 100+ member Council of Biotechnology Centers of BIO, the Biotechnology Industry Organization, and served on the Council's Board from 1993-2000. He served from 1994 until June of 1999 on the Emerging Companies Section Governing Board of BIO.

Mr. Burke has been an active participant in the national and international life science and biotechnology communities since the mid-1980s. He speaks throughout the United States and internationally on life science technology development, with particular attention to:

- The policies, issues, and development of biofuels
- The factors, strategies, and issues shaping effective biotechnology and life science communities
- The international and cultural imperatives of biotechnology development

Mr. Burke departed the North Carolina Biotechnology Center in 2009 as senior vice president for corporate affairs. Over 24 years, he helped shape the approach and strategies of the Center, the world's first targeted initiative for biotechnology development. He was responsible for varied activities and programs addressing strategic, governmental, policy, societal, and international issues. Among key outcomes: oversight of *Growing North Carolina's AgBiotech Landscape,* shaping multi-party long-term state vision; development of a nationally unique program to strengthen niche biotechnology through five regional offices across North Carolina; development with partners of *North Carolina's Strategic Plan for Biofuels Leadership* and the Biofuels Center of North Carolina; activities and policy recommendations shaping forest biotechnology and establishing the Institute of Forest Biotechnology; envisioning and establishing with partners the Bent Creek Institute, working in western North Carolina at the juncture of biotechnology with native plants; and a collaborative relationship with the German state of North

Rhine – Westphalia. Prior to joining the North Carolina Biotechnology Center in 1985 as its fifth employee, Mr. Burke taught Instructional Design at North Carolina State University in Raleigh, North Carolina. He has an undergraduate degree in Religion and Literature from Duke University, and a Master of Education in Instructional Design from the University of North Carolina at Chapel Hill. He owns, curates, and informs about the nation's largest collection of American folk art buildings.

W. Steven Burke
President and CEO, Biofuels Center of North Carolina
901 Hillsboro Street, PO Box 1919 • Oxford NC 27565 USA
919-693-3000 • Fax 919-603-5600

sburke@biofuelscenter.org • www.biofuelscenter.org

6-2011