

CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

February 28, 2008

To: Senator John Fonfara, Co-Chair, Energy and Technology Committee
Representative Steve Fontana, Co-Chair, Energy and Technology Committee

Please find attached a copy of the Connecticut Academy of Science and Engineering's testimony to be presented to the Energy and Technology Committee regarding Senate Bill Number 367, An Act Concerning a Study of Plug-in-Hybrid Electric Vehicles at its Public Hearing on February 28, 2008.

In addition to the testimony, the information provided includes:

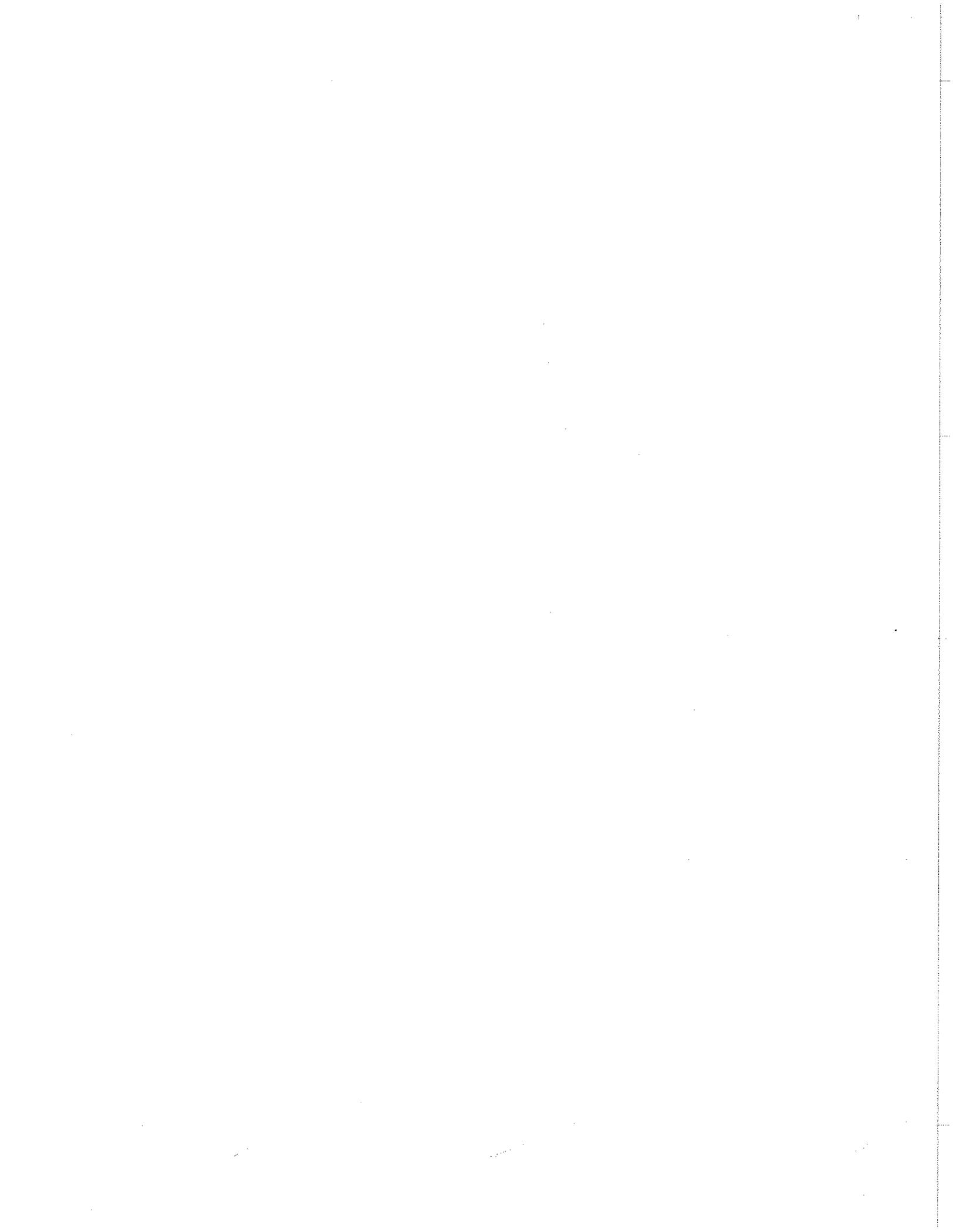
- ◆ Connecticut Academy of Science and Engineering: An Overview
- ◆ Studies Completed on Behalf of the General Assembly: FY06 Projects
- ◆ Major Studies Listing 2007 - 1994

Thank you for your time and consideration.

Best Regards,

A handwritten signature in black ink, appearing to read "R. Strauss".

Richard H. Strauss
Executive Director
E-mail: rstrauss@ctcase.org





CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

TESTIMONY OF THE CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING BEFORE THE ENERGY & TECHNOLOGY COMMITTEE OF THE CONNECTICUT GENERAL ASSEMBLY FEBRUARY 28, 2008

SENATE BILL NUMBER 367 (RAISED) AN ACT CONCERNING A STUDY OF PLUG-IN HYBRID ELECTRIC VEHICLES

Chairman Fonfara, Chairman Fontana and members of the committee, my name is Rick Strauss; I am the Executive Director of the Connecticut Academy of Science and Engineering.

The Academy is very interested in being considered to conduct the proposed study of plug-in hybrid electric vehicles.

As stated in raised Senate Bill No. 367, such a study would include whether any infrastructure improvements are necessary to “encourage the use of plug-in-hybrid and alternative-fueled vehicles by the general public.” It is suggested that this study also include an analysis of the expected benefits of plug-in hybrids, as well as other alternative-fueled vehicles that would form the basis of how and what the state may wish to do to encourage their use.

Other issues to be considered could include:

- ◆ the impact on the grid for recharging plug-in hybrids utilizing various scenarios, such as 50,000, 100,000, 150,000 vehicles, along with the net impact on fossil fuel use;
- ◆ time variant electric rates to encourage recharging at off-peak times;
- ◆ identification of advanced metering applications including the ability to provide for recharging at locations other than the user’s home with cost of charging the vehicle being billed directly to the user;
- ◆ need for and nature of 1st responder training programs to inform responders about this new technology to enable effective response for highway clearance in the event of an incident; and
- ◆ other concepts including utilizing solar power for recharging cars at garages and parking locations for employees while at work.

The Plug-In Hybrid study would be a follow-up to the Energy Alternatives and Conservation Study that the Academy completed in December 2006 on behalf of the General Assembly. Several suggestions from this study were included in the 2007 energy legislation adopted by the General Assembly. This study also suggested that:

- ◆ a program to encourage the purchase of plug-in hybrid vehicles should be considered; the use of plug-in hybrids had the potential advantage of being able to more efficiently use electrical resources by flattening out the demand and reducing reliance on fossil fuels, since plug-in hybrids can be charged during the night, when power plants operate at a low-efficiency state;
- ◆ to promote the commercialization of plug-in hybrids, the state, municipalities, and local governments consider the purchase of a fleet of these vehicles when they become available on the market; and
- ◆ the development of other alternatives to traditional vehicles powered by fossil fuels and internal combustion engines should be monitored and these vehicles should be evaluated if and when they become commercially available.

TESTIMONY OF THE CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING (*Continued*)
(FEBRUARY 28, 2008)

The Academy is a non-profit organization patterned after the National Academy of Sciences and created by special act of the General Assembly in 1976 to provide expert guidance on science and technology to the people and to the state of Connecticut. Our membership is limited by law to 250 of Connecticut's top scientists, physicians, and engineers, placed in nomination and elected by the membership of the Academy.

Since 1976, the Academy has completed over 65 studies on a variety of issues, many on behalf of the General Assembly and others for state agencies. This year the Academy was named in legislation by the General Assembly to conduct a Needs-Based Analysis of the University of Connecticut Health Center's Facilities Plan that was contracted through the Office of Legislative Management. The Academy was authorized to begin work on August 15, 2007. The project will be completed within the allocated budget and requested project period. A Briefing for the General Assembly and the release of the study report is scheduled for March 18, 2008.

Also, recent projects completed through a General Assembly grant in 2006 in addition to the Energy Alternatives and Conservation study included: Advanced Communications Technologies; and Evaluating the Impact of Supplementary Science Technology Engineering and Mathematics Educational Programs. For your information the actions taken by the state as a result of these studies are provided in materials attached to this testimony.

Additionally, in May 2007, the Academy completed a study, Guidelines for Developing a Strategic Plan for Connecticut's Stem Cell Research Program, for the Department of Public Health and the Connecticut Stem Cell Research Advisory Committee; and in August 2007 completed a project for the Connecticut Department of Transportation regarding the Feasibility of Utilizing Fuel Cells to Generate Power for the New Haven Rail Line, which ConnDOT was required to undertake on behalf of the General Assembly.

The Academy's convening authority enables us to have access to a wide range of independent expertise from technical experts from Connecticut and across the nation to address issues of concern to Connecticut. We are able to provide perspectives that are not bound by organizational structure and culture. Many of the Academy's projects have and will continue to provide the General Assembly and state agencies with guidance and advice regarding issues about which they may not be knowledgeable. Additionally, our projects seek to provide third party independent review for verification and confirmation of proposed solutions for guidance to create better policy and law.

The Academy is looking forward to working with The Renewable Energy Investments Board and the Connecticut Department of Transportation on this important project.

Thank you for your time and consideration.

Respectfully Submitted,



Richard H. Strauss
Executive Director
E-mail: rstrauss@ctcase.org

CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

AN OVERVIEW

Background:

The Connecticut Academy of Science and Engineering is a non-profit institution patterned after the National Academies that was created in 1976 by Special Act of the General Assembly. The Academy's membership, limited to 250 distinguished Connecticut scientists, physicians, and engineers, is elected by its membership. The Academy's legislatively mandated mission is to provide expert guidance on science and technology to the people and to the state of Connecticut, and promote the application of science and technology to human welfare and economic well being by:

- Advising government leaders
- Strengthening Connecticut's student science and technology programs
- Informing Connecticut's citizenry on science and technology topics

The Academy's Added-Value:

For 32 years, the Academy has provided the state with a readily available resource for timely access to sound objective technical advice, guidance and leadership. During this period, the Academy has performed over 65 in-depth studies for the Connecticut General Assembly and/or state agencies—many of which have resulted in either policy or law changes. The Academy's convening authority allows it to engage the best technical experts from Connecticut, across the nation, and the world to address issues of concern to Connecticut.

Sample Recent Activities:

➤ State Government Studies:

In-Process Studies

- ◆ General Assembly: A Needs Based Analysis of the University of Connecticut Health Center Facilities Plan (08/07 -)
- ◆ ConnDOT: Weigh Station Technologies (11/07 -)
- ◆ ConnDOT: Asset Management and Pavement Life-Cycle Cost Analysis (11/07 -)
- ◆ OPM: Development of a Real-Time Energy Report to encourage energy conservation (12/07 -)

Completed Studies

- ◆ ConnDOT: The Feasibility of Utilizing Fuel Cells to Generate Power for the New Haven Rail Line (2007)
- ◆ DPH/Stem Cell Research Advisory Committee: Guidelines for Developing a Strategic Plan for Connecticut's Stem Cell Research Program (2007)
- ◆ General Assembly: Energy Alternatives and Conservation (2006)
- ◆ General Assembly: Evaluating the Impact of Supplementary STEM Educational Programs (2006)
- ◆ General Assembly: Advanced Communications Technologies (2006)
- ◆ ConnDOT: Preparing for the Hydrogen Economy (2006)
- ◆ ConnDOT: Improving Winter Highway Maintenance – Case Studies for CT's Consideration (2006)
- ◆ ConnDOT: Information Technology Systems for Use in Incident Management & Work Zones (2006)
- ◆ DECD: Assessment of a Connecticut Technology Seed Capital Fund/Program (2005)
- ◆ ConnDOT/CTTransit: Demonstration & Evaluation of Hybrid Diesel-Electric Transit Buses (2005)
- ◆ DPH – An Evaluation of Asbestos Exposures in Occupied Space (2005)
- ◆ CEAB – Long Island Sound Symposium – A Study of Benthic Habitats (2004)

Contacts:

CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

AN OVERVIEW

➤ Technical Reviews and Assessments

- ◆ Clean Energy Fund: Hydro Tidal Turbine Technology Proposal Review (*in-process – February-March 2008*); Solar Thermal Technology Proposal Review (2007); Low-Head Hydro Power Proposal Review (2007)
- ◆ Connecticut Innovations: Extended-Life Oil Filter Technical Review (2007)
- ◆ Connecticut Center for Advanced Technology: Review of draft Fuel Cell/Hydrogen Economic Development Plan (2007)

➤ Strengthen Connecticut's Student Science and Technology Programs:

- ◆ Celebrating the achievements of young scientists and engineers through the Academy's Annual Student Awards Program
- ◆ Currently assisting the Stepping Stones Museum for Children in the development of a new Energy Exhibit that will be installed in the museum in late 2009, as well as the development of a related traveling Energy Exhibit for use in schools around the state and at the One Thing Energy Exposition in the Fall 2008.
- ◆ Conducting exciting science pilot programs on behalf of Connecticut Science Center and the Connecticut Department of Education
 - Coordinating hands-on in-class science activities in Hartford Elementary Schools presented by Mad Science (Spring 2005; Fall 2005; Spring 2006; Winter 2007)
- ◆ Engaging youth in extracurricular science and technology activities
 - Westinghouse Science Program – Metropolitan Learning Center Magnet School, Bloomfield, plus middle schools in Windsor and South Windsor.
 - Connecticut Career Choices Program - extracurricular activities in Middletown, Portland, Stamford, and Waterbury

➤ Informing Connecticut Citizenry on Science and Technology Topics:

- ◆ CT Medals of Science and Technology – responsible for selection of winners of CT Medals on behalf of Department of Higher Education
- ◆ Publish Quarterly Academy Bulletin and Annual Report
- ◆ Engaged in statewide effort to create public support for science and technology through the governor's CONNvене initiative and other activities

Contacts:

CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING
STUDIES COMPLETED ON BEHALF OF THE GENERAL ASSEMBLY
FY06 PROJECTS (NOVEMBER 2005 - DECEMBER 2006)

The following summary describes the three studies completed by the Connecticut Academy of Science and Engineering (CASE) on behalf of committees of the General Assembly in 2006. Executive Summaries and the complete study reports are available in PDF format on the Academy's website at:

<http://www.ctcase.org/index.html#sciencenews>

Energy Alternatives and Conservation

Released 12/31/06; Briefing Conducted for the Commerce and Environment Committees on February 22.

The Commerce, Energy and Technology, and Environmental Committees of the Connecticut General Assembly asked CASE to conduct an assessment of energy alternatives and conservation actions which have the potential to reduce reliance on oil and other fossil fuels over the next ten years; which are applicable to Connecticut; and which would spur innovation, diversity and consumer choice. To conduct this assessment, CASE assembled a Study Committee of both in-state and national experts on energy efficiency, conservation, and alternative energy. Energy legislation adopted in 2007 included several suggestions from this study including: development of a real-time energy report for use on TV; development of email and cell phone energy alert systems; electricity summer savings program; and municipality option to provide property tax abatement for fuel efficient vehicles.

Evaluating the Impact of Supplementary Science, Technology, Engineering and Mathematics Educational Programs

Released 12/22/06; Briefing conducted for the Education Committee on February 9.

The Education Committee of the Connecticut General Assembly asked CASE to conduct a study to identify the best practice characteristics of supplementary science, technology, engineering, and mathematics (STEM) programs outside the formal education environment, or Out-of-School Time (OST). The Education Committee also noted an interest in learning about existing cost-benefit analysis procedures and teacher training activities for OST STEM-related programs. OST programs and activities represent a critical set of supplemental learning assistance — non-school support for children and families that can enhance and promote learning and development by complementing school-day efforts. The CASE Committee agreed that to achieve the goals of this study, it would develop a framework from which the General Assembly can reliably measure the effectiveness of programs seeking funding, rather than to develop a program and cost-benefit analysis for any specific program. The Committee decided to look at “indicators” in a broad, generalized sense and then consolidate them into what is feasible with a “Connecticut Context.” The study’s “Findings and Suggestions” are based on a review of the relevant evaluation and continuous improvement literature, and interviews with key professionals involved in the design and use of evaluation and continuous improvement strategies in after-school programs. The state Department of Education posted the study on their website as a resource for organizations submitting proposals to the department to use in considering evaluation methodologies for their projects.

Advanced Communications Technologies

Released 12/15/06; Briefing Conducted for the Commerce and Energy & Technology Committees on January 25.

During the past several years, Connecticut has identified and implemented strategies for growing its economic base and for achieving a leadership position in the rapidly evolving global economy. As part of that effort, the Energy & Technology Committee of the Connecticut General Assembly asked CASE to “conduct an assessment of the benefits of creating a world-class digital/communications infrastructure (WCCI) for businesses and individuals in Connecticut, and to identify what needs to be done to accomplish that goal.” This report reflects the findings of the CASE Study Committee on Advanced Communications Technologies. Legislation was adopted in 2007 that created a Broadband Internet Coordinating Council was a direct result of this study.

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MAJOR STUDIES OF THE ACADEMY

2007

- Guidelines for Developing a Strategic Plan for Connecticut's Stem Cell Research Program

2006

- Energy Alternatives and Conservation
- Evaluating the Impact of Supplementary Science, Technology, Engineering and Mathematics Educational Programs
- Advanced Communications Technologies
- Preparing for the Hydrogen Economy: Transportation
- Improving Winter Highway Maintenance: Case Studies for Connecticut's Consideration
- Information Technology Systems for Use in Incident Management and Work Zones
- An Evaluation of the Geotechnical Engineering and Limited Environmental Assessment of the Beverly Hills Development, New Haven, Connecticut

2005

- Assessment of a Connecticut Technology Seed Capital Fund/Program
- Demonstration and Evaluation of Hybrid Diesel-Electric Transit Buses
- An Evaluation of Asbestos Exposures in Occupied Spaces

2004

- Long Island Sound Symposium: A Study of Benthic Habitats
- A Study of Railcar Lavatories and Waste Management Systems

2003

- An Analysis of Energy Available from Agricultural Byproducts, Phase II: Assessing the Energy Production Processes

- Study Update: Bus Propulsion Technologies Available in Connecticut

2002

- A Study of Fuel Cell Systems
- Transportation Investment Evaluation Methods and Tools
- An Analysis of Energy Available from Agricultural Byproducts, Phase 1: Defining the Latent Energy Available

2001

- A Study of Bus Propulsion Technologies in Connecticut

2000

- Efficacy of the Connecticut Motor Vehicle Emissions Testing Program
- Indoor Air Quality in Connecticut Schools
- Study of Radiation Exposure from the Connecticut Yankee Nuclear Power Plant

1999

- Evaluation of MTBE as a Gasoline Additive
- Strategic Plan for CASE

1998

- Radon in Drinking Water

1997

- Agricultural Biotechnology
- Connecticut Critical Technologies

1996

- Evaluation of Critical Technology Centers
- Advanced Technology Center Evaluation
- Biotechnology in Connecticut

1994

- Science and Technology Policy: Lessons from Six American States

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