

*AMERICA AND CONNECTICUT ARE A COUNTRY AND A STATE WHERE  
ENERGY WASTE IS THEIR MOST IMPORTANT AND PROLIFIC PRODUCT.*

March 5, 2013

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Co-Chairmen and Members  
Energy and Technology Committee  
Connecticut Legislature  
Room 3900, Legislative Office Building  
Hartford, CT 06106

Re: **S. B. 250, An Act Requiring Applicants of Electric Generation,  
Transmission and Distribution Facilities to Perform Energy Analyses.**

Dear Co-Chairmen and Committee Members:

The purpose of Senate Bill 250 is to provide an analytical tool for advancing one of the major imperatives of this young century— preservation and sustainability of global energy resources by reducing future energy waste, which consequently will reduce the future production of Greenhouse Gases (“GHGs”).

The bill would require each applicant proposing to create or refurbish an electric generation facility to perform life cycle net energy and energy profit and greenhouse gas production analyses as part of the application process. Transmission and distribution systems would only require life cycle energy consumption analyses.

The economics of electricity generation are important. If the financial cost of building and operating the plant cannot profitably be recouped by selling the electricity, it is not economically viable. But as energy itself is a more fundamental unit of accounting than money, it is also essential to know which generating systems produce the best return on the energy invested in them. This comprises the essence of **Life Cycle Analysis (LCA)**.

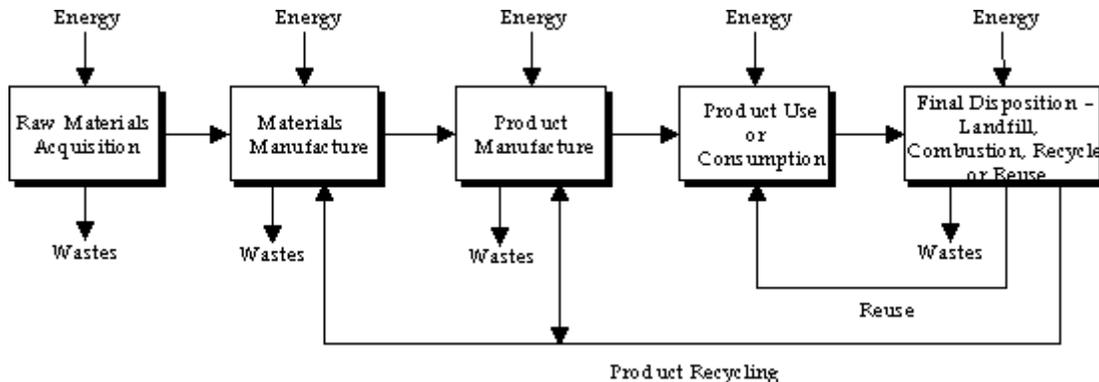
The price of fossil and nuclear fuels fluctuates according to the Law of Supply and Demand, but the heat value or energy released during transformation of the fuels does not.

Analyzing this energy balance between inputs and outputs, however, is complex because the inputs are diverse, and it is not always clear how far back the externalities should be taken in any analysis. For instance, the oil expended to move coal to a power

station, or the electricity used to enrich uranium for nuclear fuel, are generally included in the calculations. But what about the energy required to build the train or the enrichment plant? And can the electricity consumed during enrichment be compared with the fossil fuel needed for the train? Many analyses convert British Thermal Units (BTU) to kilowatt-hours (kWh), or vice versa, in which assumptions must be made about the thermal efficiency of the electricity production.

Currently such critical analyses are neither required nor performed by any applicant to the Connecticut Siting Council or even addressed in the Comprehensive Energy Strategy – see House Bill 6360, AAC Implementation of Connecticut’s Comprehensive Energy Strategy. The European Union requires such analyses and has developed a computer model for the computations. Before requiring such analyses, the Legislature should first designate and task a state agency to investigate and develop a model for preparing such analyses.

In the attachment, consider all the process steps in making a simple lead pencil, in which each process requires the expenditure of energy. Next, consider all the process steps necessary to construct, operate, maintain, repair and decommission a powerplant. Each step requires energy to accomplish the process along with energy waste and GHGs.



Analyses provide a more rational and orderly basis to reduce such waste and climate-changing byproducts. At the heart of such analyses is the consideration of alternatives to lessen energy expenditures, waste and byproducts.

In Public Act 07-242, Section 54(g), the General Assembly adopted a substantive model for energy analyses. However, the legislation had a weakness, which prevented its implementation; it failed to task an agency with developing the computational specifics for the model and failed to require applicants for energy permits or determinations of environmental compatibility to prepare such analyses. Public Act 11-80 replaced P.A.

07-242 eliminating the analysis provision. Borrowing from Section 54(g), I amended the provisions to read as follows:

When evaluating any project for the generation of electricity, the company applying to the Connecticut Siting Council or the Connecticut Public Utility Regulatory Authority shall perform a net energy analysis for each proposal. Such analysis shall include calculations of all embodied energy requirements used in the materials for initial construction of the facility over its projected useful lifetime. The analysis shall be expressed in a dimensionless unit as an energy profit ratio of energy generated by the facility to the calculated net energy expended in plant construction, maintenance and total fuel cycle energy requirements over the projected useful lifetime of the facility. The boundary for both the net energy calculations of the fuel cycle and materials for the facility construction and maintenance shall both be at the point of primary material extraction and include the energy consumed through the entire supply chain to final, but not be limited to, such subsequent steps as transportation, refinement and energy for delivery to the end consumer. The results of said net energy analysis shall be included in the results forwarded to the client. For purposes of this paragraph, "facility net energy" means the heat energy delivered by the facility contained in a fuel minus the life cycle energy used to produce the facility. "Fuel net energy" means the heat energy contained in a fuel minus the energy used to extract the fuel from the environment, refine it to a socially useful state and deliver it to consumers, and "embodied energy" means the total energy used to build and maintain a process, expressed in calorie equivalents of one type of energy.

To implement the above suggested hierarchal model, this Committee should recommend a state agency to develop the mathematical details required to determine life cycle energy and life cycle net energy expenditures, energy profit and GHG emissions.

Very truly yours,



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Robert Fromer

Attachment: A pencil's point, no government panel needed to create this writing instrument



## **A pencil's point, no government panel needed to create this writing instrument**

**By TOM PURCELL**

CAGLE COMMENTARY

Now is a good time to revisit the 1958 essay in which Leonard Read examined how a pencil is made — how it is miraculous that a pencil is made at all.

The standard pencil begins when a cedar is cut down. Ropes and gear tug it onto the bed of a truck or a rail car.

Think of all the numberless people and skills involved in mining ore to produce steel and refine the steel into saws, axes and motors, wrote Read.

Think of all the people who grow hemp, then transform it, through various stages, into a strong rope.

Think of the untold thousands of people who produce the coffee the loggers drink!

The logs are shipped to a mill and cut into slats. The slats are kiln-dried, tinted, waxed, then kiln-dried again.

How many skills were needed to produce the tint and the kilns, Read wondered. What about electric power? What about the belts, motors and other parts at the mill?

The pencil slats are shipped to a factory. A complex machine cuts grooves into each. A second machine lays lead into every other slat. Glue is applied. Two slats are sealed together as one, then cut into lengths that form pencils.

The lead alone is complex, he explains. It's not really lead. To produce it, graphite is mined in Ceylon. The graphite is, packed and shipped, then mixed with clay from Mississippi. It is treated with wetting 'agents — such as sulfonated tallow, which is formed when animal fats chemically react with sulfuric acid.

The pencil receives six coats of lacquer. Lacquer has numerous ingredients,' including castor oil. Think of all the chemists needed to create the paint — think of all the castor bean growers needed to produce, refine and ship the oil.

The brass end that holds the eraser in place is a marvel. Miners need to first extract zinc and copper from the earth. Experts transform those materials into sheet brass, which is then cut, stamped and affixed to the pencil.

That brings us to the eraser. It is made from "factice," wrote Read, a rubber-like product that is produced by rapeseed oil from the Dutch East Indies reacting with sulfur chloride.

To be sure, an awe-inspiring amount of work goes into producing a pencil. Millions of people collaborate to produce it — millions ply their unique trades and skills — yet they have no idea they are collaborating.

Each is merely changing his small piece of know-how for the money he needs to buy the goods and services he wants, wrote Read.

More amazing is this: No one person is capable of making a pencil. Not even the president of the pencil company.

No one person could possibly manage the millions of people — and the millions of decisions they make — who produce the ingredients that become a pencil.

Despite the absence of a mastermind, billions of pencils are made every year. They're produced with such humdrum efficiency that every one of us takes pencils for granted.

The pencil, explained Read, is the triumph of human freedom - a triumph of creative human energies spontaneously responding to human necessity and desire.

There never was a need for a presidential commission on the production of pencils.

Without one government program, the need for pencils arose. Without any meddling from an Ivy League bureaucrat, the pencil was invented, produced and sold — the demand for pencils was met.

It is a folly for any, man, or group of men, to think of producing something as incredibly complex as a pencil. How much harder must it be to produce a car — one that consumers will want to buy, anyhow?

Read concluded his essay with this advice: The best thing our government can do is leave our creative energies uninhibited - remove the obstacles that prevent human creativity and innovation from flowing freely.

Not create more obstacles by using taxpayer dough to take over a private company.

Thank goodness our government hasn't taken over any pencil companies yet. It would be that much more costly and difficult to write to our congressmen.

*Tom Purcell a humor columnist for the Pittsburgh Tribune-Review, is nationally syndicated exclusively by Cagle Cartoons newspaper syndicate. Visit Tom on the web at [www.TomPurcell.com](http://www.TomPurcell.com) or e-mail him at [Purcell@caglecartoons.com](mailto:Purcell@caglecartoons.com).*