

## **New Heat Engine Model Hints at Substantial Gains in Efficiency**

TUCSON, AZ -- 07-March-2007 – A centuries-old assumption used in modeling heat engines, including internal combustion engines, is being challenged by a new theory presented by physicist Frank A. Tinker. The result is a mathematical formula that is unprecedented in its ability to correctly predict measured efficiencies of these engines and hints at methods for substantially elevating efficiencies to levels currently unattainable. The discovery is detailed in a paper entitled “Occult Parasitic Energy Loss in Heat Engines” appearing in the scholarly journal “International Journal of Energy Research”. The paper can be accessed via the internet link <http://dx.doi.org/10.1002/er.1312>.

Dr. Tinker’s theory surpasses accepted thermodynamics models by nearly exactly reproducing measured efficiencies of vastly different engine types including internal combustion (ICE), gas turbine (JET), and Stirling-cycle engines. It reduces to the well-known Carnot efficiency under specific conditions and to the more recent Curzon-Ahlborn result in another regime indicating that these staples of thermodynamic theory may have a common root in Dr. Tinker’s discovery.

Perhaps most notable in the discovery is its identification of the engine operating condition under which Carnot efficiency may be obtained. Carnot has long been identified as the maximum attainable efficiency of any heat engine although its realization has been considered impossible due to the requirement of fully-developed equilibrium between the engine and its thermal baths--such equilibrium requiring an infinite amount of time to achieve. However, Dr. Tinker’s discovery apparently implies that internal combustion engines may achieve this efficiency with minor modifications to current engine designs. If true, such modifications would equate to thermodynamic, or indicated, efficiencies of approximately 50% compared with the 30% efficiencies currently achievable in ICE engines. This sort of efficiency enhancement is not simply an increase in fuel economy, but a true thermodynamic increase—that is, less fuel is required to achieve the same power output. Therefore, such an increase would mean energy savings with no reduction in performance.

A true thermodynamic efficiency increase would enable the use of smaller engines to achieve equivalent performance thereby reducing the weight of vehicles meaning further increase in fuel economy. In addition, the reduced per-cycle energy exhibited by alternative fuels such as ethanol and hydrogen, as compared with gasoline or diesel fuel used in the same engine, will be less of an issue making the use of such fuels more acceptable. Chief among the consequences, however, is in reducing the fuel requirement of internal combustion engines by approximately thirty percent resulting in enormous consumer benefit and concomitant reductions in carbon dioxide production that dwarf those proposed by the Kyoto protocols. The benefits of such a reduction notwithstanding, the economic and political consequences of such a drastic reduction in global petroleum sales (nearly 9 billion barrels of oil per year), if rapidly realized, could be problematic.

The 2003 and 2004 domestic and foreign corporate average fuel economy (CAFE) fleet mean is reported by the US Department of Transportation as 29.5 MPG. Universal adoption of the technology suggested by Dr. Tinker's discovery could potentially increase this to nearly 50 MPG. For comparison, the 2007 model year CAFE standards require 27.5 MPG or about half of what may be possible using this technology.

### **About FSNC, LLC**

FSNC, LLC is a privately owned company engaged in the development of technologies discovered and patented by Dr. Frank A. Tinker for which it has exclusive marketing rights.

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