Clean Air Technologies International Inc (CATI)
Report for
Innovative Hydrogen Solutions
Retrofit Emissions Testing Program

EXECUTIVE SUMMARY *

Innovative Hydrogen Solutions (IHS) contracted Clean Air Technologies International Inc. (CATI) to create an Environmental Technological Verification (ETV) Canada approved test program and to act as a third-party verification entity to ascertain any noticeable emission and/or fuel reductions associated with using the H2 N-GEN™. See Appendix O for details.

The goal of the test program was to generate enough valid and repeatable data so that CATI could make confident conclusions on specific emission and/or fuel performance improvements resulting from the use of the H2 N-GEN™. The test program implemented and the corresponding analysis offers a reliable assessment process for verifying the environmental performance claims as well as the technological processes of the H2 N-GEN™.

The performance claims concluded by CATI concerning the H2 N-GEN™ system are as follows:

Reduced fuel consumption:

Highway Driving (Deacon's):	30.96%
City Driving (Gimli):	13.12%

Reduced greenhouse gas emissions:

Highway Driving (Deacon's):	NOx – 23.84%; HC - 26.72%; CO – 38.23%; CO_2 - 30.82%; PM - 86.14%
City Driving (Gimli):	NOx - 8.62%; HC - 16.86%; CO - 37.63%; CO_2 - 12.71%; PM - 16.06%

In order to quantify and validate the performance claims of the H2 N-GEN™, CATI, in conjunction with IHS, conducted an extensive, two-part, on-road test designed to simulate real-world driving conditions. The test involved using a 1994 Detroit Diesel 60 Series Heavy Goods Vehicle (HGV) at two different test sites near Winnipeg, Manitoba, Canada. After conferring with ETV Canada, the CATI team also reviewed numerous testing programs conducted internally, as well as various other protocols and tests conducted by other groups (e.g., West Virginia University, Pennsylvania Transportation Institute, North Carolina State University, USEPA, CARB, etc.). From this base of data,

the initial test protocol was developed and, with input from IHS and guidance from ETV Canada, the final protocols were readied in June-July 2005.

Next, physical locations were identified that would allow for some of the aggressive driving styles in relative safety. The first test site was at Gimli Motorsport Park, located 90 km north of Winnipeg, Manitoba, Canada. The "City Suburban Cycle" (CSC) was used at this test location to simulate city driving conditions. The second test site was at Deacon's Corner (Highway No. 1, East) using the West Virginia University (WVU) "5-Peak Cycle" to simulate highway driving conditions. These cycles were selected because these were the most representative of the anticipated use of the IHS device. Based on input from IHS, CATI focused primarily on the WVU test at Deacon's Corner since the data represented highway driving conditions. Statistically, it is known that highway driving accounts for over ninety percent (90%) of the driving conducted by IHS's main target market, the long haul Heavy Goods Vehicles (HGVs).

Testing began on September 8, 2005 and was completed on November 2, 2005. The testing was conducted over this period of time to ensure that enough time passed to properly document what IHS calls the 'Hydrogen Break-in' phenomenon.

The parties used CATI's Montana Portable Emissions Measurement System (PEMS) for all testing to quantify both emission and fuel improvements attributed to the H2 N-GEN ™. The test data generated by the Montana System was witnessed, assessed, and certified by CATI as well as Wardrop Engineering, Inc. personnel. The objective was to maintain the integrity of the testing protocol through the use of independent third-party observation.

*Please note the H2 N-GEN ™ referenced in this document was a prototype from which the *í-phí™* has evolved