



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Andrew T. Redman	Project Number 22076
Project Title Development of a Shape Memory Alloy Actuated Flue Damper	
Abstract Objectives/Goals To design, construct and test a device which reduces natural gas use in waterheaters by reducing the passive heat loss up the flue pipe. The device had to be safe, easy to construct and install, at inexpensive to manufacture. Methods/Materials Incorporate a Shape Memory Alloy wire to actuate a damper valve when heat is present in the waterheater flue pipe. Test the system on a home waterheater over a period of time sufficient to determine the rate passive heat loss, given the ambient air temperature fluctuations surrounding the water heater. The device was constructed of a 24" x 4" dual wall flue pipe and bulk pieces of aluminum, brass and stainless steel. Results After testing the damper against data obtained without the damper, the data indicates that the device causes a eight to eleven percent reduction on the cycle time (time period between ignitions) of the tet waterheater. This cycle time reduction would correlate directly to a reduction in natural gas consumption. Conclusions/Discussion The device appears to have merit as a practical, simple and inexpensive to build and install consumer product which can reduce water heating bills by eight to eleven percent. I have been encouraged by the San Diego Science Fair judges to patent this device. I would appreciate an advice or guidance in this matter.	
Summary Statement Reducing natural gas consumption by reducing passive heat loss from home water heaters.	
Help Received My father helped with some of the metal work and he paid for the components.	