



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)

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Science Fair Use Only

S0805

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

Toward Energy Self-Reliance

Division

_ Junior (6-8) X Senior (9-12)

Preferred Category (See page 5 for descriptions.)

8 - Environmental Engineering

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)

Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

My project is to see if my energy consumption can be offset by the sources falling in 20 sq. m. of my back yard. This is a continuation of my project from Spring 2000. The purpose of that project was to calculate if I could use compressed air as an energy storage medium. That was feasible, so I continued collecting data on energy demand and supply for the entire year. I collected data on solar energy using a photovoltaic cell and a solar powered Sterling engine; on wind energy using an anemometer; on rain energy using a rain gauge. These were recorded every 15 minutes for 14 months. I logged my personal energy consumption for 1 week each month. I calculated the theoretical total energy based on the sum of:

- Wind turbines for wind energy,
- Solar panels for photovoltaic sun energy,
- Sterling engines for thermal sun energy,
- A water turbine for rain falling on my roof.

Each device was scaled from the collected data.

From last year, I knew that there would be surplus energy times and deficit times and that energy storage is necessary. My new data confirmed that compressed air pumped storage is still feasible and led me to a startling conclusion on my energy self-reliance.

Summary Statement (In one sentence, state what your project is about.)

I calculated what would have to be done to live independently from a gasoline and electricity provider

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

My dad helped and guided my with the construction of the necessary equipment and aided me in the use of Microsoft Excel for calculations