ENER-GUYZ

Dr. Stan Gelove

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Math Consultants
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Dear Math Consultant,

Our company is on the cutting edge of a new chemical process which will revolutionize the world's energy supply and solve many of the world's most pressing concerns over oil, non-renewable resources, and carbon emissions! Our batteries will be cost-effective, portable, and will completely replace the need for fossil fuels!

I seek your assistance with some mathematical issues we have been facing in perfecting our process.

You see, we don't know precisely *how* much energy will be released. After extensive modeling, extremely small scale testing, and decades of development, we have uncovered a complicated relationship between the power generated and the rate of power generated. If $P(t)$ is the power generation, in kW, at time t, in minutes, we know that

$$\frac{dP}{dt} = \frac{P^3 - 10P^2 + 25P}{50 + Pt}$$

Of course this equation is only valid for $t \geq 0$.

What we need is a good estimate of how much power will actually be produced each minute, as well as an estimate of how much energy overall will be produced over the course of an hour, if we calibrate the battery to 1 kW of power on activation. It is extremely important to have a good estimate. We would also like to know if higher calibrations are possible, and what the best power level would be to maximize the amount of energy produced without . . . catastrophic results. Our engineering team says they should be able to adjust the initial activation power to as high as about 8 kW. Perhaps you can advise about this.

So please, we seek your assistance, and hope you will be able to dissolve our problem!

Sincerely yours,

Dr. Stan Gelove