

GeoSol

Save electricity by running CPU intensive jobs only during sunlight hours.

Combines a city to location database, a sunrise/sunset calculator, and a process supervisor to save electricity.

Background

Modern CPUs are becoming better and better and only drawing power when they are actually doing work. Clock speeds and even core voltages are kept low unless needed. Conversely, when running heavy tasks such as processing video, rendering 3D graphics, or running simulations the system's power draw can increase dramatically.

For example, look at the whole-system power draw for two high-end desktop processors as of November 2020:

CPU	Idle	100% load	Multiplier
AMD 5950X	64W	204W	x3.2
Intel 10900K	70W	336W	x4.8

The AMD system uses more than three times the power under load, while the Intel uses almost five times more. Clearly it makes sense to try and run these high-CPU jobs when electricity is available from a more renewable source.

Solar Power

I have an array of solar panels on the roof of my home (and office). During daylight hours they provide more power than I can use. The excess is sold to the grid at a considerable discount. I buy power back from the grid during the night. Therefore I try and run dish and clothes washers, hot water heaters, etc... during the day wherever possible.

Another solution to the problem would be to invest in a battery storage system. I have chosen to buy a bigger solar array instead, as I think it is more efficient -- at the society level.

Subprocess control

Stop long-running computations at dusk, then resume them at dawn (or a few hours before or after each):

```
import subprocess
import signal
import time

p = subprocess.Popen(['mpg123', '-C', 'music.mp3'])
time.sleep(3)
print('stop')
p.send_signal(signal.SIGSTOP)
time.sleep(3)
print('continue')
p.send_signal(signal.SIGCONT)
time.sleep(3)
p.terminate()
```