

There are many reasons to buy CoolSaver but Return On Investment (ROI) is often ignored.

Here are a few facts.

To run refrigeration you need energy. What does it cost to generate the energy?

If you are already running your engine, generator or connected to shore power, the cost is zero or negligible because the extra energy refrigeration consumes is negligible.

If you are not running on the above, you are running off batteries or solar (photo voltaic) or wind. Of these sources only batteries, provided they have the capacity are always available as there may not be wind or sun available when you need it. For example no wind or a clouds rain make solar and wind power unavailable. So battery sizing needs to take into account powering your refrigerator for say a week while you are away and cannot run the engine or generator.

While wind and solar power are producers of energy and over their life pay for themselves many times over, batteries store energy for times when alternatives are not available. Batteries are expensive, dangerous, take space, add weight, have a limited life and need expensive care. (The expensive chargers, combiners etc. whose costs rise with battery bank size and number) Having the minimum battery size for your requirements can save initial and ongoing expenses.

Now lets look at running the engine to charge batteries. Many folks have expensive AGM batteries as they can absorb charge at double the rate of lead acid wet cells so they can minimize engine run time for battery charging. Running a diesel engine to only charge batteries is tough on the engine, it lowers the engine life, and increases maintenance costs making the cost of fuel a minor issue. AGM's are beneficial here but they also handle less recharge cycles than lead acid wet cells and are twice the cost.

So either battery cost is high and engine operating cost is lower with AGM's or battery cost is lower and engine operating cost is higher. Bottom line is that owning and using batteries is expensive.

The bigger the battery bank the more it costs. AGM batteries run at about \$250/100amp hour and wet cell about half, \$125. Engine operating costs vary, a new engine is \$15,000+ installed in a 30+ foot sailboat. The cost per running hour for battery charging is really high. Battery life is about 5 years and should not be run down below 50% capacity. Experts recommend subtracting an extra 20% leaving only 30% of the capacity truly available. In addition if a single cell in a battery in a bank fails, you end up replacing the bank as banks should only have batteries of the same type and age.

Bottom line is, don't have more capacity than you need.

So, if your refrigeration can run with a lower power consumption when excess energy is not available you save a lot on batteries, on engine hours or on managing with less solar panel capacity or a smaller wind generator.

CoolSaver can lower your refrigeration energy consumption when its most important, the times when energy is from the battery bank. It does this by running at a low speed where we save about 9% just on compressor performance and along with raising the temperature which reduces losses (Newton's Law of Cooling) and coasting by using stored cooling as ice or in products. It can save between 30-50% of energy usage when running from batteries.

Running for a week on batteries alone could consume 50 amp hours a day, so 350 amp hours a week. Conservatively CoolSaver could reduce consumption by 100amp hours which means your battery bank size by 200 or more amp hours.

This is equivalent to a battery savings of \$250 to \$500 plus the additional savings in lower cost of equipment, (alternators, regulators, wiring copper, solar panels and wind generators) as well as operating costs for the charging equipment. Taking into account the limited life of the batteries, we estimate that in the worst case CoolSaver will save \$150/year and depending on

your situation, possibly considerably more.

In purchasing CoolSaver, the return on investment is probably around 2 years or less plus better control, less chance of food spoilage and the boat can be left for longer without emptying the refrigerator.

Compare this ROI with adding solar panels to your home. With Federal and State rebates in MA along with selling energy credits, and in special cases for which most of us don't qualify we may get to a 6 year ROI. And we will be creating a carbon footprint that takes 4 years to recover! (The ROI without rebates is > 10 years.)