

Living Off Grid with Solar Power System design choice, Gas (Lpg) or Electric Fridge Freezer ?

For this comparison and cost report compiled on Saturday 4th December 2010 I have used the internet to source two Fridge Freezers that are compatible in size one is the Lpg Taver T242 probably the most popular LPG freezer available in Spain and as my LPG Fridge Freezer choice is limited I have matched it to a Indesit RAA24 A+ Electric Fridge Freezer. I have included the lowest on-line price I could find for both units.

Taver T242 LPG Fridge Freezer



Indesit RAA24 Fridge Freezer



Technical Specifications	
Total Storage Capacity	235 lts
Fridge Capacity	191 lts
Freezer Capacity	44 ltrs
Dimensions	154x54x69cm
Doors	2
Best Price	767 €
Power Source	Lpg

Technical Specifications	
Total Storage Capacity	230 lts
Fridge Capacity	187 lts
Freezer Capacity	43 ltrs
Dimensions	135x54x60cm
Doors	2
Best Price	243 €
Power Source	Electricity

So we have our two Fridge Freezers for comparison, fairly close on technical specifications. The Indesit RAA24 isn't the most energy efficient unit I could have chosen but it is a good match and a good price for a A+ rated unit. I could have chosen other models for a similar price with a greater storage capacity and similar energy consumption but I wanted a similar storage capacity to the Taver.

Next we must look at the costing, in running both units in our Off Grid Solar Powered Home. As with most of my articles it is strongly based on real life experiences with enough mathematics to ease us through to a conclusion .

The first constant we must fix is the assumption that we already have an off grid system installed with enough energy being captured and stored to run our off grid home. As the Electric Fridge Freezer isn't a great power hungry device in terms or raw power needed I think it is fair to say even a small Inverter Charger of around 1500 watts would easily cope with the addition of an A+ electric fridge freezer .

Calculating the extra battery capacity needed to run this extra appliance from your planned or existing battery bank, installed is almost impossible to calculate and isn't worth the time to cover the many variables for the purpose of this article . So I will keep it simple and calculate the extra amount of solar panels required to add to your existing or planned system to cover the addition of adding a Electric Fridge Freezer to your home and I will be generous in favour of the Gas unit in my calculations of extra panels needed.

The Indesit TAA24 uses 226 kwh (kilo watt hours) per annum
That equates to 226 divided by 365 to 0.62 kwh a day.

Assuming that we average 3 hours sun a day in Spain (told you I would be generous to the gas fridge) . that would mean we would need an extra 206 watts of generated power to cover the daily consumption of the electric unit.

In a Solar Off Grid System there are system losses across the generation and storing or energy, converting solar power production in to storage in the batteries and converting the stored DC (direct current) via the Inverter to AC (alternating current) that the mains powered electric fridge freezer uses. You may be surprised to learn that these losses add up and many off grid experts across the globe have different percentages on this total conversion losses, but I don't think I would get much moaning from most if we put the efficiency across the board in our off grid solar battery based system at fifty percent yes 50%. !

So therefore we need to double our solar power generation to compensate for these system losses to 412 watts. To be more than fair to the gas fridge freezer I'm going to round up the extra PV power required to 450 watts. So that we are in no doubt that we have covered the energy consumption of our electric fridge freezer.

So living in North Eastern Spain assuming a very generous low average of 3 hours of sun a day I need to buy 450 watts of extra solar panels to run my fridge. PV Prices are readily available around 2.60 € a watt retail, some of mine as we speak are less than this so (again cutting the gas fridge freezer even more slack) we will base our purchase price on 2.70 € a watt

That means we need to purchase 1215 € of new PV Solar Panels to power our new electric fridge freezer.

Back to the gas fridge freezer, having polled many gas fridge freezer owners in my location, it is fair to say that a standard bottle of Repsol or Cepsa gas that we all use here will last for about 3 weeks on average, thus we would need just over 17 bottles of gas (52/3) a year to run our gas fridge freezer. Assuming current price of 13 € a bottle that's $17 \times 13 = 221$ € a year in gas to run your fridge. Please bear in mind that gas prices vary and have been as high as 14.5 € a bottle in the recent past, and as sure as death and taxes, the cost of LPG is only going in one direction long term.

I think we have enough information now to calculate the payback time on adding a New Indesit TAA244 A+ Fridge Freezer in to our off grid solar system with the extra solar panels against the Taver LPG unit which needs no extra solar power but does require gas to run.

So the initial outlay for the Taver T242 Fridge Freezer is 767 € whereas the Indesit RAA24 is 243 € plus the additional cost of 1215 € for the extra solar panels makes an initial outlay of 1458 € That's an extra 691 € initial outlay for the electric fridge freezer solar option.

Assuming (again giving the benefit of doubt to the gas corner) that gas prices remain the same then with an annual gas bill of 17 bottles @ 13 € each it comes to 221 € per annum

To find how long before the electric option breaks even with the gas option we simply take the 691 € extra cost of the Electric and solar panels and divide by the per annum running costs of the gas 221 € and we get a figure of **3.13 years**.

So giving gas fridge freezers every break and benefit of the doubt in assumptions we can after just three years brake even with the electric solar option . I expect if we did this with as closer cost comparison it would be less that 2 years.

So after 3 years of living on gas refrigeration your blowing 221 € a year on gas and assuming you panels keep producing power for the next 20 yrs that's a saving of 4,420 € assuming that gas is still 13 € a bottle in 2030.

Also on a personal note having lived in Spain for nearly five years now, I have yet to be given an Ice Cold beer from anyone with a gas fridge freezer ever.

That may sound unfair, but my bench mark is my Samsung American Fridge Freezer which has the fridge set at the recommended setting of 1 degree C so every beer is as cold as possible without being frozen.

The only time that I can see gas fridge freezers having a place and being cost effective is for off grid holiday homes used for 8-10 weeks a year.

Other downsides to gas refrigerators not taken into account is they need regular cleaning and maintenance if they are to operate well and safely.

Also bear in mind that if both the gas and electric units are replaced every 6-7 years the replacement cost of the gas unit is currently triple that of the electric units.

Also with that extra solar you will benefit from fuller batteries lasting longer, less genny run time especially in winter when the fridge freezer doesn't work as hard as in summer, but you have more sunshine in summer when the energy consumption is higher from the fridge freezer

This document is meant to be informative and helpful, it is based on my experiences and opinions. Please consider further research and professional advice before making you refrigeration choices for your solar off grid home.

PS I don't sell Fridge Freezers

Nigel Prism Solar