

I think it is my duty to come with a comment on this one. Just to make one thing 100% clear I'm not against a diesel driveline the most important for me is that everybody know the difference in the daily use before making the final decision.

Fact, and from my point of view pros and cons.

1. Reliability
2. Exchange of ANEMIS motor and the process.
3. Storing of energy
4. Solar and output
5. Pros and cons

1.

Is an electrical engine reliable? Let's get back in history and think how many electrical engines actually turning every day. Nikola Tesla started to develop AC motors in the late 1800 around the same time as Nicolaus Otto invented the first combustion engine (ICE) called the Otto engine.

Both types are for sure today super reliable with the huge difference in the amount of estimated running hours.

Electrical engine 15-20 years nonstop without maintenance. Think on the water circulation pump in a house.

ICE engine Lets talk Volvo. Estimated 5-7000 hours means less than a year and that's with a good maintenance. I'll just ask if anybody will buy a boat with 5000 hours engine time and expect problem free sailing for years?

There is no gearbox in an electrical engine, no idle speed hours and the only maintenance is the greasing of the bearing at the shaft.

2.

Why did I then have to change the engine in ANEMIS?

When I decided to go for the Oceanvolt I have spend quite some time to run true the different electrical engines on the market. Some have air cooling, other high voltage with the risk of electrical chock other is super heavy.

I'm into the understanding of the electrical system however I'm raised in a car workshop, so I think I have a bit more than a basic knowledge of both systems.

After running true the new invented Oceanvolt system building modules together with integrated controller it was for me a now brainier not to go for that solution in the field of electrical engine.

Well knowing ANEMIS would be the prototype sailboat with the new AXE motor. First system with a shaft engine. For me it would be fun to be a part of the testing and upgrading the system to run reliable.

To state one misunderstanding we have never had any problems with propulsion. Only been working with the possibility to generate power when sailing.

We have had 4 different propellers and maybe 50 different software in the system. Under one of the Oceanvolt remote software adjustment there was a fatal mistake. Due to the system build by modules the modules start working against each other one tried to run forward right after the next wanted to go backwards and so on. Means all the energy was let loose inside the engine maybe only for a few seconds before Oceanvolt remotely switched off everything.

After we corrected the mistake, and everything was running again for a long time. It happened in Denmark and first time I had a feeling something was wrong was motorsailing into Porto 2 month later. No major thing just some high temperature on a bearing. 4 month later when we were at Tenerife Oceanvolt had send the parts to the marina office. When I had to exchange the part, we realised it was a bit more serious situation.

Oceanvolt called the team together and within a day it was decided they wanted to ship a brand new engine to me. 7 days later it was delivered and 6 hours later I singlehanded had demounted the old engine and mounted the new one. It had been impossible to do with any Diesel engine. See the movie on YouTube.

Status now is we have a good solution for the hydrogeneration we can produce up to 450W when sailing above 7kn and around 300W around 6kn.

So yes the system works and now everybody can use it.

3.

From my point of view the only new Technology is the way we store our energy. What is energy is the first question to answer.

Energy is not only watt, amperes and volts it is also what's needed to move the boat. All of us for sure like to use the sails as the main source for sailing.

It can't be discussed that storing of energy is best done in fossil fuel, Diesel, gasoline, propangas ect. Either it can't be discussed that the greenest energy we can get is from the sun, wind or water movement.

The difficulty thing is to store electrical energy and here a huge development is taking place. Electrical cars are one of the huge drivers, however we as sailors benefit from it. From my point of view the less know technology in an electrical boat.

I hope all new boats will have LiFePO4 batteries except the battery use as the starter battery. It is today price wise, volume weight, the best way of storing electricity. Nobody has figured out how to store AC and the only source that generating that is solar cells. That's why solar and batteries goes so well together. A wind turbine is normal 3 phases(AC) send into the MPPT that's convert this to DC to be stored. Same from the alternator on a Diesel engine, most generator ect.

The contactless electrical engines, like the Oceanvolt need AC to run. The modules of the motor have that converter/inverter build in so nothing to think about in the daily use. My generator deliver 48vDC and can charge the batteries direct with 15Kw. More than 1000A if it was a 12v system.

It means if I run the generator for 1 hour, I charge from 25% - 85% or I can sail almost 2 hours around 6kt or stay at anchor for a long time even without the help from the sun and solar. One hour Generator uses 4-4,5l diesel.

I think normal charger is only 3Kw so when running a 5Kw 230vAC generator for charging there is a huge overcapacity on the generator that is not used. Worst thing is running the main engine for charging unless it's built with a double or triple size alternator.

4.

Solar gives more in the north than in the Caribbean. A huge misunderstanding is that the more south you go the more power you can get from the sun. The chemistry in solar panels works best below 25 degrees losing a little up to 30 and a lot on higher temperature. It is different from brand to brand and also here there is a huge development. From we got ANEMIS summer 2019 to summer 2020 I could by adding 60% to

the surface get the double in energy. I didn't pay any attention to the solar Garcia by default have chosen but it was not the newest technology.

My experience by sailing both in the North, Mediterranean and also the Caribbean is on a sunny day the following.

Denmark panels value X 6-7 a day. 1000w solar = 6-7000Wh

Mediterranean panels value X 4-5 a day.

Caribbean panels value X 3-5 a day. Windy days gives a good cooling to the panels.

5.

Pros.

A huge usable battery bank 28Kw = 2300Ah at 12vDC

Long time at anchor

Fast charging

Silence sailing

No need for refilling gas bottles

A simpler and maintenance free driveline.

Always warm water from the electrical heater. 4 people onboard usage 3-4kwh a day.

No need to run the main engine to charge batteries.

Huge torque on the main engine

A little silence engine help when sailing I light wind.

More fuel efficient when motor sailing.

More sources for power generating. Solar, sailing, generator.

Cons.

Less knowledge about battery technology everywhere.

More expensive to begin with.

Unknown

Used price compare to a standard diesel drive line.

Statement from me

There are no limitations in a hybrid solution like we have on ANEMIS.

Basic knowledge about everything in the boat is needed also the electrical system and special the B&G random updates.

I use a little less diesel when motor sailing due to the more efficient engine on the generator.

It is more expensive but also gives so much more freedom.

You can never have too much energy on a boat, there will for sure come more and more electrical stuff on board. Electrical scooters, outboard, baking machine, electrical barbeque all camera, computer ect.

Hope this is helpful and if there are specific questions just let me know.