

A Quiet Revolution



By Hans Unkles

Introduction

- My name is Hans Unkles
- I am a Fisherman and a boatbuilder
- I left school to a boat building apprenticeship
- I started diving for scallops at 21
- Since then, I have fitted out roughly 20 fishing boats and yachts
- I have skipper owned 9 different potting boats from orkney 16 to gemini 10m Cat



Welcome to a presentation on my experience of converting my boat to being **all electric** and then how I am getting on fishing it.

- A quick run through of some pictures
- Charging options
- Practical use
- Finances
- Range and range anxiety
- Compliance
- Developing the Future
- Conclusions























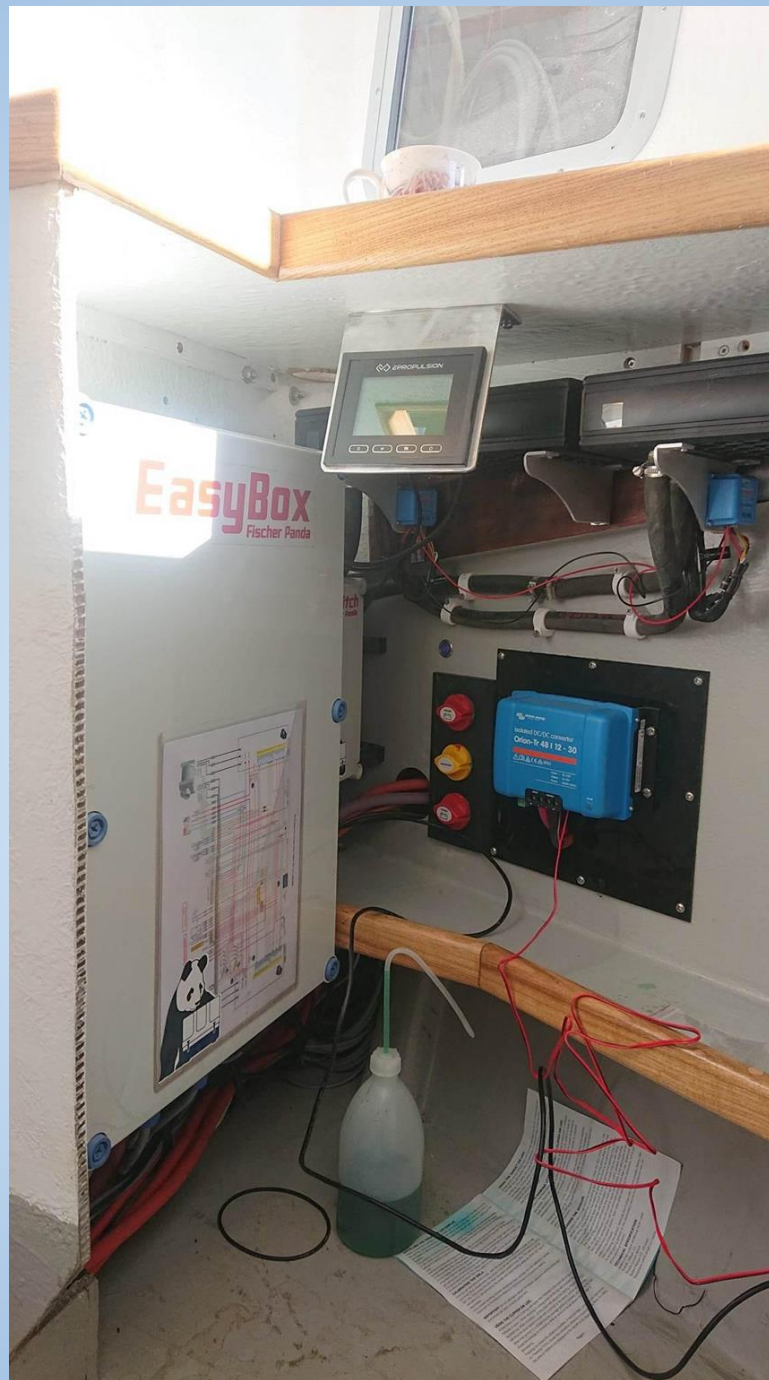
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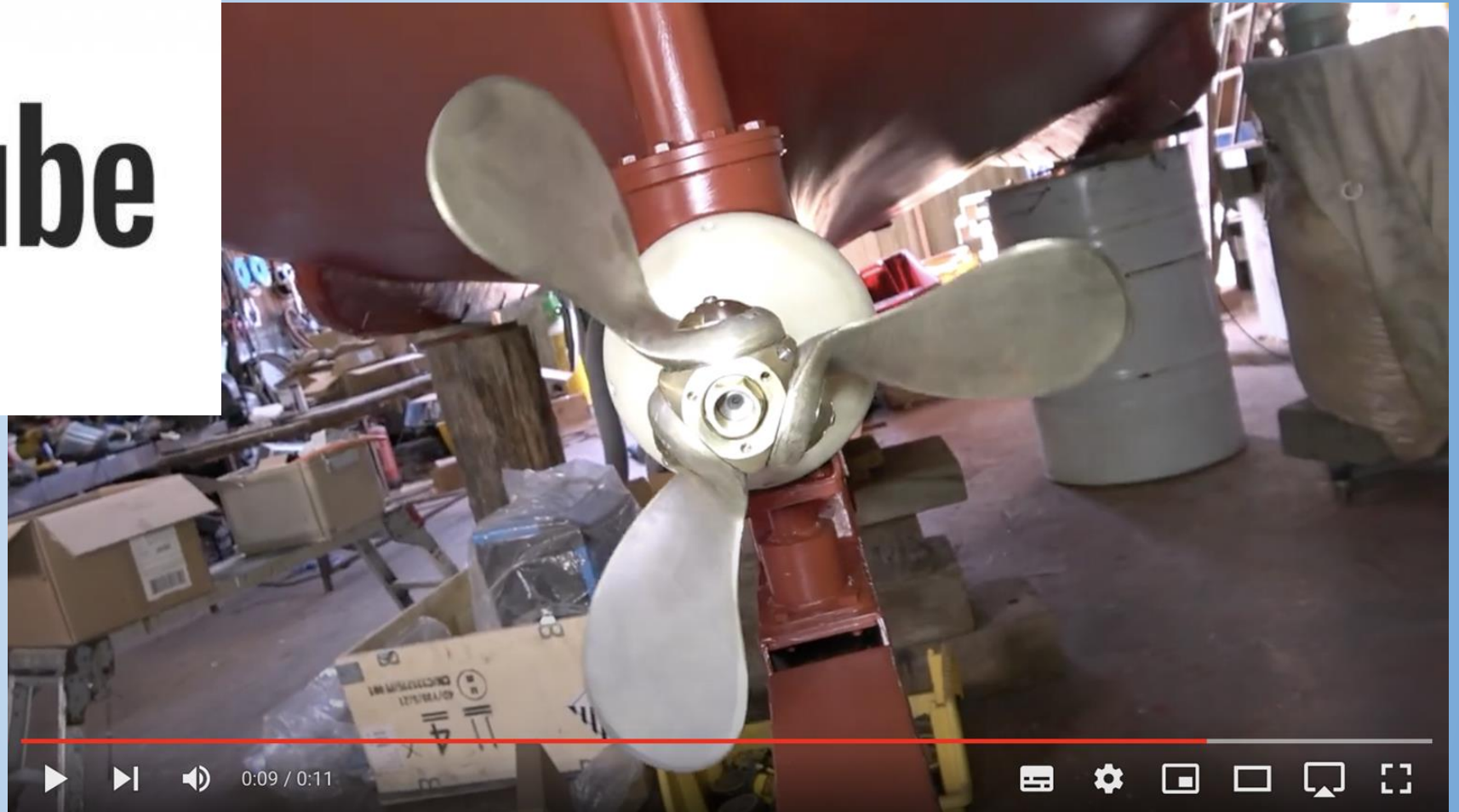












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Comparative Production

Month

Quarter

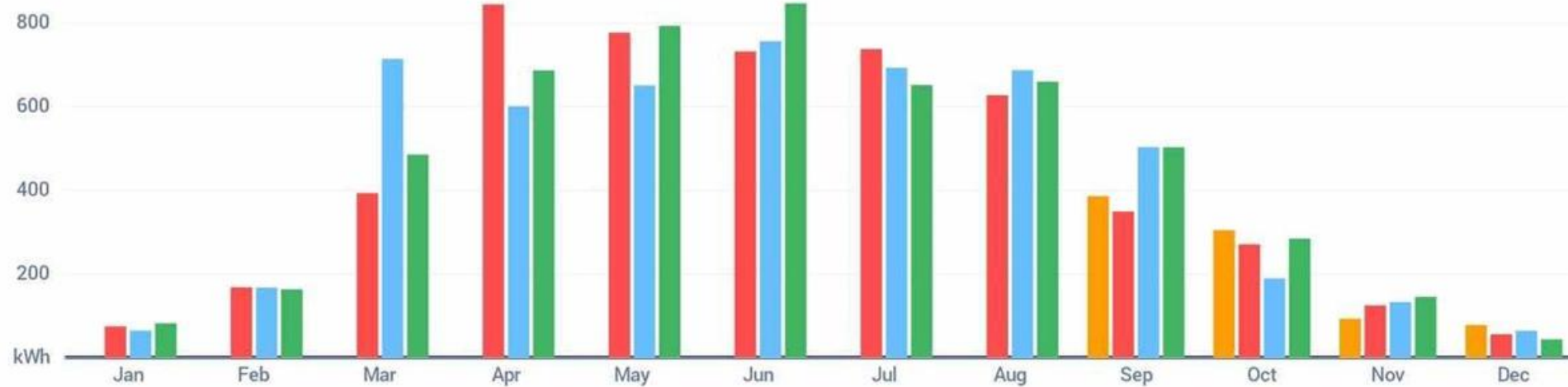
Year

2020

2021

2022

2023



Primary Charging Source: Solar

- The boat has 4 x 460w bifacial panels making 1.8kw of solar power
- 6 or 7 kw per day is easily achieved, with 10kw not uncommon and a peak of 12kw
- I was generating on average 200kw + per month from June to September
- On average, I have been using between 15 and 25kw/day
- Bear in mind the boat is charging as it is being used.
- There have been technical charging problems with the solar that I will discuss later.



Charging From Shore power

- To fill from a shore power 16amp blue plug should take under 15 hours; empty to full.
- The boat is rarely empty.
- It is a similar time from a household 13 amp plug
- This is a really straight forward process and has worked seamlessly.
- The charging usually takes place through the night when grid wind power is at an excess



Charging from Wind

- I have the capability to add a wind turbine in the future
- There is a fairly small output compared to summer solar
- In the summer it is likely that the shading from the wind turbine will be relevant
- I am intending to install a wind generator for next winter and will have more informed information



Practical Use

- Intention has been to fish 1, 2 or 3 days a week.
- Working day is like for like: Steam to gear → haul → reset → steam home
- Significantly slower – prop change this winter
- Break downs and servicing are significantly down.
- The hauler is electric motor powered hydraulics is every bit a
- The boat steers very differently which gives a balance of advantages and disadvantages
- Never need to smell of diesel again
- I cannot quantify the benefit to the working day gained from the silence
- Kettle gets boiled 5 times a day



Rough Finances

Motor - £19,100
Batteries - £20,500
PV - £1,170
Hauler - £6,425
MCA costs £1320
Sundry costs £4,000
Original vessel £20,000
Time - Admin - £20,000
Time-Building - £40,000
Stock materials - £4,000

Net: £136,515
Funding: £34,865
Total: £101,650



I can argue the finances make some kind of sense

- Costs less than building a new diesel boat
- Like for like; you've got a better boat

I can argue they make no sense at all

Small scale fishing won't justify the expense . 30k for a similar boat.

Recharge Costs



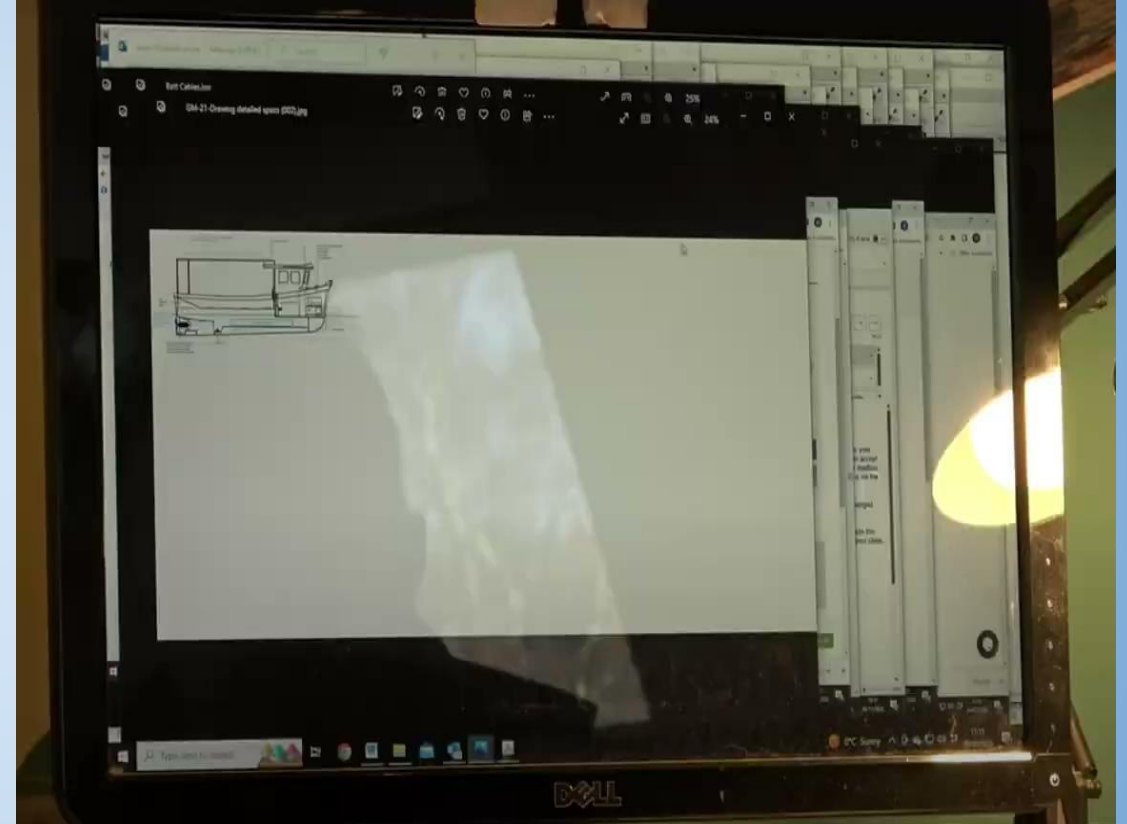
- £0.75kw x capacity of 45kw = £31.50
 - Total July to Dec £465.50
- Pontoon charges = £15/night
 - Total july/Dec £260
- Generator and fuel costs.....£132.65
- Pontoon charges, electricity and generator petrol = Total to £18.17/day
 - Electricity alone could be as little as £5.27/day
- Technically it is possible to discharge a car, van battery or trailered battery pack into the boat at the pier – many possibilities here...

Funding

Here is a time lapse of some of the documents I had to present to apply for the funding.

I received from the 'Maritime and Fisheries Fund' a final total of £34,865.37

I found the funding system and application like a social, economic and mathematical sage program on steroids. For an individual or small business without a dedicated admin team, it was physically and mentally crippling.



This was/is the most traumatic part of the whole process. This gets me wound up so much

I'm not going to talk about it.

Range Figures

- Current capacity 45 kw - which is the same as 1 gallon of diesel
- I have covered a total of 1200 miles in 46 days fishing
 - Averaging 26 miles per day
 - Roughly 6 hours 50 minutes per day
- Range - depends hugely on how much throttle
- The boat is happy at 5 knots which without any solar input, gives a continuous range of 60 miles. At 6 knots, the range is approximately 25 miles
- Continual stopping and starting (as is the case with creel fishing) eats heavily into the range
- The hydraulics use very little power unless heavily loaded, but even at that it is barely 2kw. In most cases, the solar keeps up with it.



I could bail the boat continuously for almost 2 days (45 hours)

At this stage developing a prototype is about taking risks.

Taking risks is in our DNA.



Out of these two I want
the wing suit guy on
my boat...

To progress, we need
to find a happy
medium. There must
be more emphasis on
guidance with a less
clinical approach from
the controlling bodies.

How to answer an exam question?

A lot of examiner feedback has commented on HOW the student is answering questions, the 3 options are fully explained below

Explain (how to make a cup of tea)

Check water level in kettle to ensure that there is enough water to fill a cup & to prevent it from boiling dry. Plug the kettle in and switch it on at the wall socket & the kettle switch. Take a cup of the correct size, place it open side up on the work surface where it can be reached by the kettle. Open the tea caddy and remove a single tea bag and place it in the cup. When the kettle has boiled, indicated by steam issuing from the spout, whistle or auto switch off, switch it off at the socket to avoid electrical shock.

Carefully, so as to not get scalded, lift the kettle up & pour the water into the cup to the required level, leaving enough room for the correct amount of milk. Put the kettle down carefully back onto the work surface. Leave the tea to brew for the required strength to develop, usually 3 to 5 minutes. Carefully remove the tea bag with a spoon taking care not to break it, be aware that the tea bag will still be hot so place it carefully in the bin. Milk & sugar, to taste, can now be added and stirred with the spoon to obtain the correct mixture.

Describe (how to make a cup of tea)

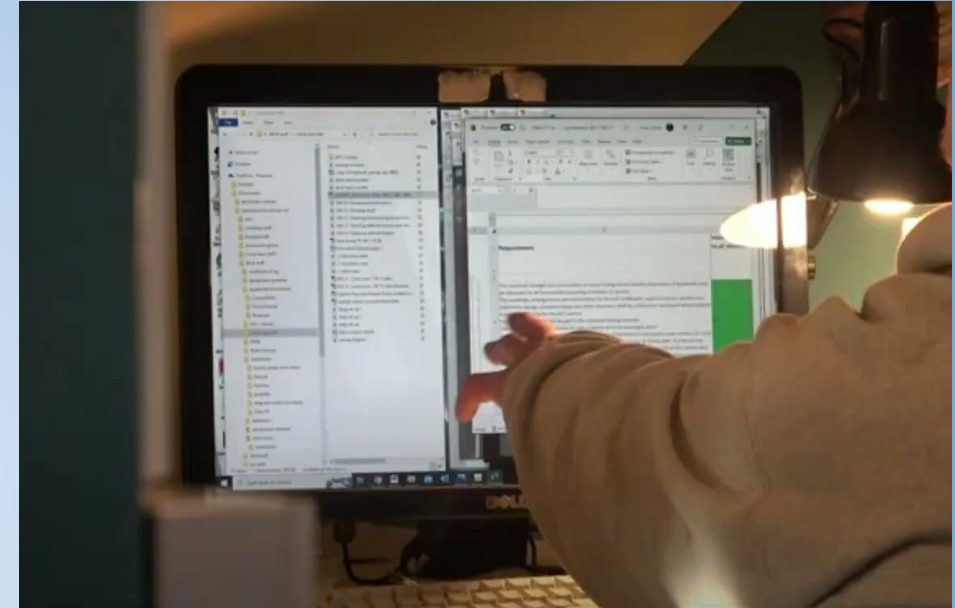
After ensuring there is water in the kettle, plug it in and switch it on. Remove a cup from the cupboard and place a tea bag in it. When the kettle has boiled, switch it off at the socket and pour the correct amount of water into the cup. Wait about 3 to 5 minutes for the tea to brew. Remove the tea bag with a spoon and place in the bin. Add milk & sugar to taste.

Procedure (how to make a cup of tea)

1. Check water level in kettle, fill if required
2. Plug in kettle & switch on
3. Get cup and place teabag in cup
4. When kettle has boiled switch off
5. Pour water into cup to required level
6. After 3 to 5 minutes remove tea bag
7. Add milk & sugar.

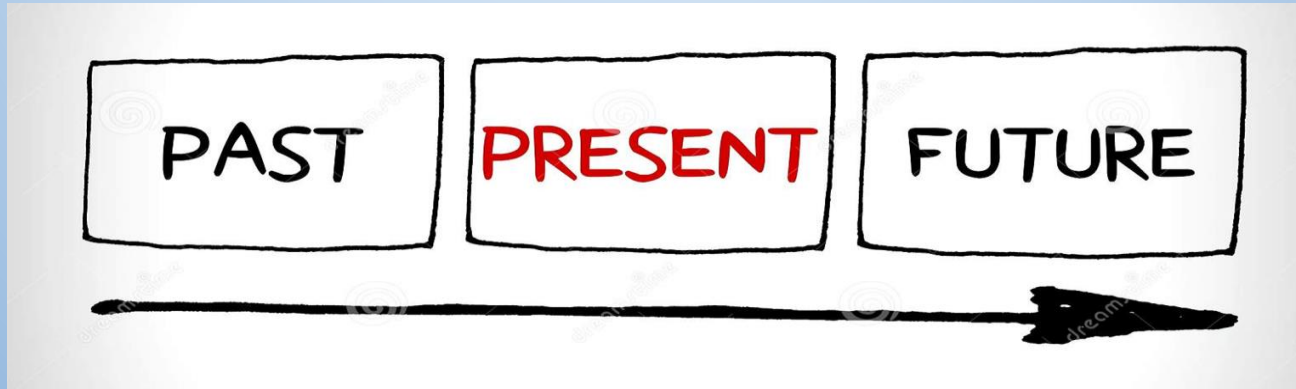
Compliance

- The compliance is achievable at time, effort and monetary cost
- My initial feeling was that I was tolerated by the system, rather than encouraged through this process
- The appointed surveyor and I have together created a good working relationship, by listening to each other's professional input
- The workload to address the requirements came at the same time as the funding workload. For small businesses this is a real time/effort/cash flow problem. Very few small businesses if any will have the time, resources or drive to navigate this part of what is a fairly simple building process. Help is needed
- I have had to pay the MCA for the extra work related to the conversion. This is because public money has to be accounted for. I would argue that as each vessel receives a 5 year survey FOC. My 5 years was due at the same time as the conversion. All the changes to my vessel were due to the electric conversion. The MCA had no blueprint or coding in place for an electric vessel so had to develop this from my prototype. The learning from my vessel will be used for future vessels yet... I have been billed for their time.
- A trusting working relationship is essential to encourage and develop new technologies. Trust in both directions between fishermen and surveyors must be addressed and developed with some urgency. The MCA have been actively trying to improve relations and communications with fishermen. Fishermen should welcome this and in my opinion, air their grievances.
- In my experience compliance for battery electric is workable and achievable. This process should become easier.



Developing the Future

- Changing the way fishermen think is the key to this
- Inshore fleet has to be encouraged towards slow boats as they are the only realistic option
- Look at ways that adopters are supported and not disadvantaged over non-adopters
- I don't think many people understand how electricity works... it is easier to grasp mechanics but not electrics. Therefore, more training required, especially at the boatyard end for the future fishermen.
- Converting to an electric boat is the same principle as owning an electric car, once you've bought it, its usability is to do with your attitude towards it. If you really want to work at making it work, it works. If you don't really want to commit to making it work, it won't.
- It is essential that there is investment in shore charging facilities; without these, it is not practical to buy a battery powered boat.



Conclusion

The conversion and the components have presented no technical difficulties.

We have to acknowledge there will be sacrifices and hardship coming at us.

Accepting this and acting to deal with this on your own terms, puts you in a much
stronger position.

We don't have to create faster, bigger and greedier boats, just ones that work and adopters
must be advantaged over non adopters.

My boat is a practically and financially viable.

I was one man coordinating and building the entire project, and had a wake of 'public
money funded' organisations to pull along with me.

There needs be a method to get resources directly to private enterprises and the boat
builders/fisherman who can evolve results quickly and productively.

In my 42 years of boatbuilding, this has been the most refreshing, interesting, nourishing
and rewarding build I have ever done.

So for that reason alone it is a success.



Thank you for
listening

