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Magazine 2011

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# BUILDING NEW OR **REFITTING**: FOOTPRINTS COMPARED

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BY NICK JEFFERY

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**Eco's** original gas turbine / waterjet combination has been refitted for slower but more efficient cruising. Now named Enigma, she is likely to be fitted with new propulsion again one day.

Only a minority of owners or charterers of superyachts put environment-protection at the top of their list of requirements. Nevertheless – even though a "green superyacht" seems an oxymoron – builders are investigating ways of producing yachts with lower carbon footprints, whether building new or refitting, and weighing up the pros, cons and CO<sub>2</sub>. A quiet transition towards sustainability is in the air.

Polling a number of yacht builders on whether they believe it is better to refit a superyacht or build new, purely from an environmental impact point of view (without taking into account financial considerations), compelling evidence is forthcoming that new build wins – at least in the long term. Only motor vessels were considered, sailing yachts clearly eating up miles with minimal fossil fuel consumption. Three parts of the "life cycle" are taken into account in the Eco-indicator 99 impact assessment method: Production, Use and Disposal (scrapping/recycling). A major refit is defined as "taking at least six months" by both Cristian Schwarzwald of Blohm + Voss Yachts and Ronno Schouten of Feadship – possibly involving lengthening the yacht or including a complete new interior with new equipment.

## DISPOSAL: RECYCLING / SCRAPPING

Disposal through recycling or scrapping a yacht is usually ignored since there is always somebody who will pick up an old hulk and keep her afloat – Vitters' Louis Hamming says *"I have never seen a yacht scrapped. Even if they are years old and should have been left in the mud, there is always somebody with a nostalgic idea that takes them out of the mud and starts with a project much worse than a new build! People always see (emotional) value in something old and scruffy."*

Vincenzo Poeri of Benetti, nevertheless, believes that investment needs to be made to find ways to recycle and that while existing yachts should be refitted – respecting the new environmental technology and rules – once it is no longer economically convenient they should be recycled: *"boats over 30 years old will then be scrapped rather than refitted"*.

As a last resort, recycling the steel/aluminium of a stripped-out superyacht does give some benefit, avoiding the production of new materials. Feadship has never scrapped a yacht, nor has an expected lifetime for them, but states that *"due to recycling, scrapping is actually beneficial for the environment – copper and more expensive materials like the propeller and gold in the interior could be recycled"*, adding *"Most of the woodwork and insulation will be hard to recycle"*. They reckon on an environmental impact 'credit' of 240,000 eco-points (explained later), assuming three quarters of the steel and aluminium can be recycled.



© KINGSHIP

**GREEN VOYAGER**, billed as "the world's first unique custom Hybrid Superyacht", uses Siemens' SISHIP EcoProp system, allowing powering by diesel, diesel electric and battery, or batteries alone – the philosophy being to "use every litre of diesel burned or store it for later use".

Kingship, builders of Green Voyager, believe that at least 80% of the weight of a yacht can be recycled, including wooden furniture, also pointing out that CAT engines have a rebuilding program. Diana Liang (Sales & Marketing Director) adds *"there is no question that selling the yacht on to be used will return more than scrapping"*. She states *"Scrapping is highly polluting, but since it almost never happens for yachts, it must be considered a low environmental risk" – "IMO conventions yet to come into force on hazardous material and scrapping will vastly minimize the effect this has on the environment"*.

The two builder opinions appear to be contradictory. In fact, even if there is pollution when scrapping certain parts of a yacht, as long as a good amount of metal is recycled – thus preventing extra (environment-unfriendly) production of these materials – then the net result of disposal can be positive for the environment.

## PRODUCTION: BUILDING / REFITTING

Between production and use, the environmental impact clearly depends upon how much the boat is used. Feadship's research data indicates that the impact of *"building a yacht is in general 'only' equal to one or two years of cruising. Therefore building a new more environmentally friendly and more efficient yacht may indeed be better for the environment"*.

Kingship does not make assumptions about how much use a superyacht gets, as it is intensely variable, some rarely leaving port. Nevertheless they have environmental procedures at the yard to minimize production impact of the environment (difficult to measure, except in the emission of volatile organic compounds / VOCs). They believe building a new yacht has less damaging environmental impact as *"a major refit involves double the work and energy – removing old, then installing new items, this process risking causing a lot of pollution and waste"*.



© BLOHM + VOSS

#### BLOHM & VOSS NEW CLASSIC

A 111-metre new build proposed for those who like traditional styling but want to build from new, using the latest technology.

Green Voyager, billed as “the world’s first unique custom Hybrid Superyacht” and the first 24 to 50-metre to be awarded the RINA Green Plus Platinum certification, uses Siemens’ SISHIP EcoProp system, allowing powering by diesel, diesel electric and battery, or batteries alone – the philosophy being to “use every litre of diesel burned or store it for later use”.

Nicholas Stark of Hanseatic Marine, builders of Silver, built to SOLAS, believes that “Diesel electric is a two-edged sword: fundamentally the same energy is still needed to propel the hull; you still need to burn the diesel. The lightweight, efficient hulls we have built to date are the result of a conscious decision to minimize the environmental footprint of our boats. The use of highly optimized hulls and lightweight structures will combine to have significantly less impact on the planet’s oil reserves than a great many traditional yachts. For example Silver would happily do 7 knots while consuming less power than a modern saloon car”.

Schwarzwalder points out that a refit will automatically reduce the impact a yacht has on the environment – for example replacing a 20-year-old genset with a new generation one – but favours the new build option too. Blohm + Voss is touting an efficient 111m vintage-look new-build project to whet appetites. A refit rarely involves changes to the hull shape, except for a small stern extension perhaps, and might even mean extra displacement if the superstructure is enlarged resulting in a less efficient hull moving through the sea.

Moving materials for new builds and refits can have a significant impact. McMullen & Wing avoid the use of teak decks (even with replanting there is a significant land use involved in growing teak) and have used granite. Selective use of materials and the avoidance of rare woods or skins is a step forward. Mark Smith of Michael Leach Design said that for their recently launched, 96-metre Palladium “very expensive, high-tech but eco-friendly

*finishes that do not harm or deplete the universe were specified”.*

Feadship’s joint two-year research project into environmental impact of refitting or new building made its calculations using the Eco-Indicator 99 method which allows for the aggregation of several environmental impacts such as global warming, acidification and toxic effects into one ‘score’, based on the Life Cycle Assessment (LCA) methodology. Building a 70-metre yacht would have the negative environmental impact of 520,000 eco points and regular maintenance including drydocking, repainting, anodes etc 2,200 eco-points per year. The actual use of the yacht is estimated at 450,000 eco-points per year, which mainly consists of fuel consumption (including impact of fuel production as well as its emissions). Refitting a yacht is calculated to cause 95,000 eco-points.

Balancing the aforementioned 240,000 eco-points ‘credit’ for scrapping another boat at the same time and assuming a 30-year old yacht



has 10% higher fuel consumption and requires 10% more maintenance gives the result: 'scrapping plus new build' works out as 185,000 eco-points more damaging than a refit at launch – but subtracting the annual saving compared to a refitted boat of 45,220 eco-points, this option beats a refit after about 4 years. The chart gives a persuasive argument to build a new superyacht!

## USE: YACHTING AND LIFE ABOARD

Other than burning up fossil fuels to get from A to B – or more likely Monaco to St Tropez – the largest item of impact in terms of emissions is the Heating, Ventilation and Air-Conditioning (HVAC) system, whether new build or refit. This subject has come up in two of the Yacht Club de Monaco's annual spring environmental symposia and there is certainly a movement – or at least talk of one – towards marina developers and operators playing their part by supplying electrical power at the berth, from a clean source, to avoid the use of generators. Schwarzwald believes that marinas should eventually enforce the use of shore power, banning the running of generators, but provide it at a fair cost, rather than inflated prices – just because it is for expensive yachts. Chief stewardesses could do their part,



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### LADY B

The elegant sloop "Lady B", one of MCM's sailing yacht projects recognized at the World Superyacht Awards, was a pioneer in planning the use of Siemens technology with three small diesels driving AC generators, the output driving E motors on a combining gearbox – even though it was dropped as the technology was eventually going to be ready within the timeframe – something for a future refit?

simply by explaining the extra cost of running air-conditioning, especially out on deck.

Federico Bennewitz of Viareggio Superyachts (VSY) – all of whose yachts have auxiliary diesel electric propulsion for quiet harbor use – is an advocate of new build and believes that Life Cycle Assessments (LCAs) are not particularly useful unless something will change as a result of all the measurements and it is possible to compare competitors' data.

Bennewitz firmly believes that one significant improvement would be a global directive to reduce the sulphur content in fuel. "Presently in some cruising areas good quality fuel of under 1000ppm is not available

– the antiparticle filters and catalyzers cannot treat over 1000ppm", he says.

Liveras Yachts, owner-operators who manage the 60-metre Andreas L always seek out the cleanest fuel available for their charters, with the lowest sulphur content. One of their greenest charters is ironically at the Monaco Grand Prix watching the F1 cars race by – as the yachts in port do not move for 5 days!

According to VSY calculations, the production of 4000 kW for propulsion and 800kW for hotel/auxiliary requirements on a 62-metre motor yacht equals the energy requirements for 1,600 apartments. Similarly, CO2 emissions for a week's cruise equals six years use of a high-powered car.



© MICHAEL LEACH DESIGN

#### PALLADIUM

Guests can relax in the 96-metre Palladium's upper deck bar, knowing that Michael Leach Design avoided rare woods and even opted for special, elaborate new metallic surface treatments rather than sheets of metal. These could be used for eco-friendly interior refits of the future too.

Nuclear rods (take care to drop off your spent rods in the right marina recycling bin) and fuel cells (the owner of "Ethereal" built his boat so that she could be retrofitted with fuel cells within a decade, replacing existing lithium ion batteries) are feasible options for the future. Fuel cells are used extensively in German submarines and that is one area where crossover between yachting and shipping might benefit the environment.

Blohm + Voss, awarded joint Motor Yacht of the Year and winner of the best displacement motor yacht of 3000GT and above, with the 162.5-metre Eclipse, plus a Judges' Special Award for Palladium at the World Superyacht Awards in May, seem to be well placed to draw on Hamburg's enormous pool of efficient shipbuilding skills and green technology.

Designers harnessing the sun, wind (eg. the Skysail system) and wave

energy, both on yachts and in the marina environment – tapping into the Earth's core for geothermal energy might one day create enough power to recharge yachts in their berths – are likely to win hearts as yacht owners, guests and charterers reassess their core values in life.

Superyacht owners and charterers will eventually demand to be seen doing the right thing, project managers such as Marine Construction Management (MCM) adding detailed sections on environmental impact to pre-contract development discussions, with 'green' recommendations, before owners make a final decision on builder and designer and whether to do a major refit or build new.

There are too many variables to conclude whether new build is better than a major refit for the environment, and each project needs to be evaluated on a case-by-case basis, however green superyachting

is here for good, even if it seems an oxymoron.

Perhaps brokerage houses will guide buyers and charterers by switching from corporate Red/Blue/Yellow to Green for a day at a future MYS – listing yachts by 'green mermaid' emission ratings and swapping the thirsty SUVs for eco-cars to ferry clients about, slowly.

The automotive industry sometimes influences superyacht design and, with the likes of HRH the Duke of Cambridge driving out of Buckingham Palace in a refitted 41-year-old Aston Martin Volante, running on bioethanol fuel, and HSH Prince Albert set to cruise silently down from Le Palais de Monaco in a new Lexus Hybrid, eco-superyachting could become fashionable too. The industry just awaits one trendsetter to commission a royal green yacht – refit or new – to accelerate the transition to sustainability.