Practical Approach to Energy Efficient Operations
What successful companies do to become energy efficient operators

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DNV have over the last 5 years assisted shipping companies to reduce fuel consumption through Energy Management programmes. The DNV reference list accounts for 20 different shipping companies representing all major shipping segments. These projects have primarily addressed energy efficiency improvements and reduced annual fuel consumption for existing ships in the fleet.

This paper discusses key success factors that should be addressed in order to become energy efficient ship operators. The success factors are not the result of a scientific research project. It is collective summary of the successes and failures DNV Maritime Solutions have observed from management and technical consulting projects with ship operators. Companies that address the success factors listed below have a greater chance to succeed with fuel saving initiatives, than those who don't. An overview of these success factors is presented in Figure 1.

SUCCESS FACTORS	DESCRIPTION
Holistic	▪ Ensure ownership and commitment ▪ Chase opportunities beyond technology ▪ Involve whole organisation (ship and shore)
Prioritise	▪ Identify improvement areas ▪ Prioritise according impact and implementation difficulties
Structured	▪ Develop plans and set goals ▪ Commitment and continuous effort
Measure	▪ Define KPI's and manage energy efficiency performance ▪ Invest in tools to measure performance
Pragmatism	▪ Don't seek perfection or overcomplicate things ▪ Carry out pilot tests ▪ Celebrate success and failures equally - Have fun
Follow through	▪ Build culture and competence ▪ Measure performance towards agreed targets

Figure 1. Success factors to become an energy efficient operator

Holistic

Energy management is a company-wide initiative that goes beyond just addressing technical improvements. A holistic approach to energy management ensures that you are able to assess and involve all levels and functions within your company that have an impact on the energy consumption.

Commence this task by mapping all stakeholders within the company, onshore and onboard, that make decisions or carry out work tasks that influence energy consumption. Include the company management that make strategic and tactical decisions which influence the energy consumption through fleet mixture, ship designs and trade decisions.

Include fuel purchasers and those responsible for commercial and technical operation of the ships as well the crew that influence energy consumption on daily basis.

A holistic approach with involvement of all stakeholder groups will also ensure commitment, teamwork and knowledge transfer which is critical to ensure successful implementation.

Prioritise

Many aspects influence energy efficiency. Most of these are common knowledge among ship operators. However, only few companies take the time to identify which improvement initiative will give the highest cost/benefit for their fleet and operation.

The costs/benefits can be assessed by comparing the optimal performance with current performance for all aspects that influence the energy consumption. Cost/benefit analysis does not have to use advanced and complicated calculation models, but should be sufficient to give comfort that the benefits are achievable.

A prioritisation matrix where the improvement initiatives are ranked according to impacts (benefits) and implementation complexity will make sure that quick wins are addressed first.

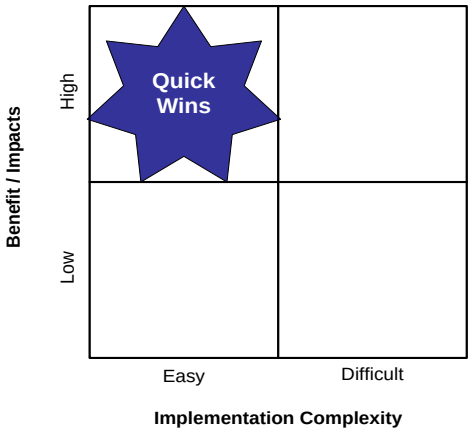

Figure 2. Implementation Complexity

Structured

Structured efforts are the only route to sustainable energy efficiency improvements. Ad-hoc attempts can give some positive effects, but the effect is normally lost when the attempt is terminated.

Make a structured and detailed plan on how to develop and implement the solutions for the improvement initiatives prioritised (ref above). The plan needs to document a clear scope, objectives and milestones for benefit realisation. Be realistic and free up time for resources involved.

Measure

Fuel consumption per 24 hours is the historical energy efficiency measure used onboard ships. However, this is not a sufficient parameter to monitor and manage energy efficiency. Measuring and managing energy efficiency on ships is complicated because:

- Lack of accurate measuring equipment for energy input and output (fuel flow meters, torque meters, speed through water, etc)
- Presence of many parameters with large uncertainties influence energy efficiency (e.g. waves, wind, current, trim, marine growth on hull and propeller, etc)
- Difficulty to isolate effects of some parameters

Define energy efficiency performance indicators in a hierarchy where the top level is linked to company value drivers (e.g. energy costs per transport work). Energy efficiency is normally defined as specific fuel consumption (e.g. output divided on input) and is a guide that can be used at all levels in a performance hierarchy. The first level of performance management should be to cover the parameters with low uncertainties to build confidence in data and performance. A staged approach forms a solid platform to extend the performance management and inclusion of new indicators.
Implementation of a permanent business intelligence system is necessary, at some stage, to have reliable data and efficient performance analysis. However, lack of a business tool should not prevent you starting - temporary solutions are normally adequate to test out ideas.

Be pragmatic

Working with energy efficiency requires pragmatism. Perfection with energy efficiency is close to "mission impossible"! Accept that it is difficult to isolate the effects and currents, poor data quality, lack of baselines, no performance management tools, high level of stakeholders, etc. etc. Don't let imperfections and hurdles stop you!

Accept the reality and pilot-tests unfinished solutions. Use the pilot-tests to build enthusiasm and trust from sea and shore personnel on energy efficiency. A small amount of structure and a spreadsheet is in many cases enough to pilot-test new ideas on a few ships.
Use experiences from pilot-tests to demonstrate impact and direct development of permanent solutions that will work fleet-wide.

Follow through

Many companies have tested out ideas, but only a few have improved energy efficiency significantly. Successful implementation requires understanding of the key enablers and the stamina to make the changes stick and become a new way of life for the company. Do not initiate too many new initiatives at the same time – make sure that you are able to see each one through to an appropriate conclusion. Key enablers are normally related to people competence, internal processes and technology. Be mentally prepared that implementation is likely to take a longer time and be more complicated than expected. Don't let up and follow through! Progress measurements are the only means to document and confirm that you are on track.

Conclusion

The above success factors can be the difference between success and failure. They have been deliberately made generic for the purposes of this paper knowing that their relevance will differ between companies and settings. We therefore recommend you translate the above descriptions into your own success factors and make them specific for your company and actual setting.

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