

Legal conditions regarding the energy efficiency of fishing vessels

Małgorzata Sawicka, Marcin Szczepanek

Maritime University of Szczecin, Faculty of Mechanical Engineering, Institute of Ship Power Plant Operation
70-500 Szczecin, ul. Wały Chrobrego 1–2,
e-mail: małgorzatasawicka@poczta.fm, m.szczepanek@am.szczecin.pl

Key words: energy efficiency, fishing vessels, legal acts, recommendations of IMO and IEA

Abstract

Due to the lack of legislation specifically referring to the energy efficiency of ships, the following acts and recommendations, which shall be referred to during preparation and conducting the energy efficiency assessment of fishing vessels, have been recalled and briefly characterized in this paper.

Introduction

According to Art. 3, par. 1 of the Act of 15th April 2011 (Journal of Laws No. 94, item. 551 with amendments) on energy efficiency “energy efficiency is a ratio of the obtained volume of useful effect for a particular object, technical device or system, in typical conditions of their use or operation, to the amount of energy consumed by the object, technical device or system, necessary to obtain such result” [1].

Limitation and elimination of ineffective use of energy constitute one of the main goals of the European Union. Energy efficiency improvement will be decisive for competitiveness, ensuring of supply safety and meeting the requirements regarding climate change adopted within Kyoto protocol.

The increasing prices of energy sources and regulations on environment protection provide higher requirements to the fisheries sector. Numerous fishing vessels are the structures that were built many years ago, of obsolete technical solutions, often re-constructed and modernized by shipowners. The vessels are usually operated in low-efficient manner when taking into consideration the relation of the amount of energy consumed during operation to useful effect in the form of catch volume. The assessment and improvement of energy efficiency for the fleet has become a necessity having regard

to the changing requirements for environment protection, as well as the market which has become more competitive.

Given the fact that practically there are no legal acts in the Polish legal system that refer directly to the energy efficiency of ships and/or efficiency audit, therefore, it is deemed to be justified to rely on the provisions mainly concerning buildings and to implement the regulations included therein to assess the energy efficiency of the fishing fleet. Given the above, this paper has been based also on the legal provisions of the European Union and the recommendations of IMO. When discussing the legal conditions regarding the energy efficiency it shall be remembered that there is a number of European norms governing the presented issue.

Main legal regulations

Council Regulation (EC) No. 744/2008 of 24 July 2008 instituting a temporary specific action aiming to promote the restructuring of the European Community fishing fleets affected by the economic crisis

Council Regulation (EC) No. 744/2008 of 24 July 2008 instituting a temporary specific action aiming to promote the restructuring of the European Community fishing fleets affected by the economic crisis comprises of the provisions regarding the modernisation of fishing fleet in terms of imple-

menting techniques for fuel-efficient catches. In that case provision 12 of the Preamble is significant and it reads as follows:

“(12) A Community contribution should also be provided for collective actions aimed at delivering expertise to vessel owners in relation to energy audits for vessels, and expert advice on the development of restructuring and modernisation plans and Fleet Adaptation Schemes” [2].

Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels

The Directive mentioned above was adopted by the EU Council on 21st November 2012. It is of great importance in respect to the solutions related with the energy efficiency improvement of fishing vessels. The Directive determines an allowable limit of sulphur content of the fuel used by every vessel at the area covered by the SECA requirements, that is Sulphur Emission Control Area specified by IMO. By July 2013, SECA covered the area of the Baltic Sea, the North Sea and the La Manche Channel. Commencing on July 2013, the SECA area covered also the coastal waters of the North America [3]. According to the Directive, the sulphur content of marine fuels shall equal to 0.1% starting from 1st January 2015. Ultimately, the content shall be reduced to 0.5% by 1st January 2020.

As per par. 6 of the Preamble the Member States should encourage the use of shore-side electricity, as the electricity for present-day ships is usually provided by auxiliary engines. The application of such solution would affect the energy efficiency of vessel [4].

Par. 16 of the Preamble includes the EU position in terms of facilitating the transition to new engine technologies due to which further emission reductions in the maritime sector will occur. According to the further provisions of the paragraph the Commission should further explore opportunities to install gas-powered engines in ships [4].

Act of 30th August 2012 on the conformity assessment system and the Act of 20th April 2004 on marine equipment

The Act on marine equipment refers to the system of conformity assessment with the requirements for marine equipment and to actions related with the control system of the said equipment. The following goals of the Act, which are identical as the goals of the Act on the conformity assessment (Art. 2 thereof), are significant:

1. elimination of hazards created by marine equipment [...] for the environment;
2. raising the standards of maritime safety;
3. creating conditions for reliable assessment of marine equipment and the construction process of marine equipment by competent and independent bodies [5].

The Act together with the Act on the conformity assessment provide grounds for setting certain requirements for the energy efficiency of fishing fleet, and in particular in terms of the use of machines and devices having suitable certificates.

Obtaining the certificates (CE) is an extremely complex process. In order to obtain CE marking, a machine or a device must meet a number of requirements included in the Directives, norms, legal acts both domestic and international. It is of great significance in the scope of energy efficiency conformity assessment of vessels which are subject to modernization or adaptation. Increasingly higher requirements related with environment protection drastically affect the requirements for the construction of machines and devices in the scope of e.g. fuel-consumption, use of fumes for heating.

Act of 15 April 2011 on energy efficiency (Journal of Laws No. 94, item. 551 as amended)

The goal of the Act on energy efficiency is to meet the recommendation arising from the European Union Directive regarding energy end use efficiency. The recommendations concern mainly energy saving. The Act determines, among the others, control methods (audits) [6].

The provisions of Art. 10, clause 2 of the Act, which indicate the possible measures for energy efficiency improvement, are significant. Among the measures the most significant are:

1. purchase of a new device, system [...] characterized by low energy consumption and low operational costs,
2. replacement of a device, system in operation [...] with devices, systems [...] mentioned above or their modernization [1].

The Act imposes an obligation to evidence the amount of energy saved in the form of so-called efficiency certificates (white certificates). In case of the lack of such a certificate for the appropriate amount of energy saved, a compensatory payment shall be paid. The certificates prove that energy efficiency has been improved.

Section 5 of the Act on energy efficiency is entirely devoted to the principles regarding energy efficiency audit performance and obtaining a license for energy efficiency auditor.

Act of 16th March 1995 on prevention of marine pollution by vessels (Journal of Laws of 1995, No. 47, item 243)

In the context of energy efficiency, the above-mentioned Act has been recalled due to the provisions of Art. 9a which is as follows:

It is forbidden to:

1. burn waste other than waste produced as a result of normal vessel operation:
 - a) on every vessel being at the Polish marine areas;
 - b) on vessels under the Polish flag located in the Baltic Sea area;
2. burn waste produced as a result of normal vessel operation on vessels being at the Polish territorial waters and inland maritime waters [7].

Ordinance of the Minister of Economy of 10th August 2012 on the detailed scope of energy efficiency audits and methods for energy efficiency performance, energy efficiency card scheme and energy saving calculation methods

The Ordinance specifies the detailed scope and method for energy efficiency audit, audit card scheme, data and methods which may be applicable to determine and verify obtained energy savings, means to assess energy efficiency of heat supply.

The Ordinance includes the term of full audit and simplified audit. The simplified audit is limited only to the projects listed in Annex 1 to the Ordinance. According to the said document, it should include such elements as: owner data, description and assessment of technical condition, energy consumption analysis for the object in question, assessment of effects obtained as a result of the project aimed at the energy efficiency improvement, description of possible types and options for the execution of projects aimed at energy efficiency improvement and documentation related with calculation of energy savings. On the other hand, full audit should include more detailed information regarding diagnosis and technical assessment of the object e.g. general technical data (reporting and measuring), data verification – by the assessment of measurement errors and internal consistency, more important substance balances (means) and energy and the assessment of modernity of solutions applicable to the object [6].

Notice of the Minister of Economy of 21st December 2012 on detailed list of projects aimed at energy efficiency improvement

The Annex to the Notice constitutes a list of projects that aim at energy efficiency improvement. Among the projects, there are the projects which

may be referred to fishing vessels and they are specified below [8].

1. Projects aiming at energy efficiency improvement in the scope of modernization or replacement of:
 - internal lighting or lighting including:
 - a) replacement of light source for energy-saving;
 - b) replacement of luminaries together with fittings for energy-saving;
 - c) implementation of controlled parameter lighting systems (intensity, efficiency, control) depending on consumer needs;
 - d) use of energy-saving power supply systems;
 - devices for own use, including:
 - a) air and fume fans;
 - b) pump systems and pumps – use of pumps of stepless speed control;
 - c) control systems – automation systems for boiler, measurement, protection and signal systems;
 - d) compressors and compressor systems;
 - e) electric motors – installation of inverters for drivers of variable power requirements;
 - f) devices in water treatment systems.
2. Projects aiming at energy efficiency improvement in the scope of devices and systems used in industrial processes:
 - a) modernisation or replacement of energy and technological devices together with installations: compressors, electric motors, pumps, fans and their drivers and control systems or use of inverters for drivers of variable power requirements;
 - b) modernization or replacement of pipelines, tanks, fume ducts, funnels, water treatment devices;
 - c) use of measurement and monitoring systems for energy utilities.
3. Projects aiming at energy efficiency improvement in the scope of energy recovery in industrial processes, including installation and modernization of:
 - a) heat recovery systems from devices and industrial processes and use of the heat for practical purposes or in a technological process;
 - b) freecooling system – process where cold in the air of low temperature outside a building is used for cooling the air inside the building;
 - c) turbines and energy generation systems using the energy of depressurization or pressure reduction of gases, vapour or water;

- d) processing systems of heat recovered from industrial processes for electricity;
 - e) processing systems of waste gases from industrial processes (e.g. coke oven gas, blast furnace gas, basis oxygen furnace gas) and fumes for electricity and heat energy or energy fuels.
4. Projects aiming at energy efficiency improvement in the scope of loss reduction:
- a) related with passive power consumption by diverse electricity receivers, including by using local and central systems for passive power compensation (capacitor banks, glands and machine and electronic compensatory systems);
 - b) while transformation in transformers by:
 - use of compensatory systems in low load conditions and idle mode;
 - replacement of transformers with units of higher energy efficiency or adjustment to power demand.

IMO REGULATION, Ship Energy Efficiency Management Plan (SEEMP)

Commencing on 1st January 2013, Ship Energy Efficiency Management Plan (SEEMP), according to Annex VI of the MARPOL Convention, became a mandatory document for vessels over 400 GT.

SEEMP is an instrument the goal of which is to assist shipowners at energy efficiency management of their fleet and of practical measures for efficiency improvement in terms of operation [9]. According to the opinion of the International Chamber of Shipping SEEMP incorporates the best practices for the fuel efficient operation of ships, such as better speed management throughout a ships voyage, for example. Such efficiency measures will significantly reduce fuel consumption and, consequently, CO₂ emissions [10].

SEEMP should be developed in accordance with the recommendations included in Resolution MEPC.213(63) adopted by IMO. Under Par. 4 thereof SEEMP includes:

1. Planning;
2. Implementation;
3. Monitoring;
4. Self-evaluation and improvement.

Under Regulation 22 of Annex VI of the MARPOL Convention, in case of SEEMP, meeting the requirements included in the said regulation shall be confirmed by IEE Certificate (International Energy Efficiency Certificate). Polski Rejestr Statków (PRS) [Polish Ship Register], in the publication titled *Przepisy Nadzoru Konwencyjnego Statków*

Morskich Nr 2/2012 do Części IX, Ochrona Środowiska, [Convention Supervision Provisions for Marine Vessels No. 2/2012 to Part IX, Environment Protection] of 2011, detailed information regarding possibility or the manner in which a vessel may obtain an IEE Certificate. For the existing vessels, IEECs have been issued since 1st January 2013. The vessel may obtain such a certificate upon the completion of successful inspection and once the compliance with the requirements in the scope of operational energy efficiency specified in the abovementioned Resolution 22 of Annex VI to the Convention and implemented on the vessel by SEEMP has been proved. Upon SEEMP verification, which shall be developed by shipowner under Par. 9.5.1.4 of the said document, and upon PRS control, during which it is verified whether the existing ship has SEEMP, within the deadline specified in Par. 9.5.1.3 of the said document, IEE Certificate shall be issued for the existing ship [11].

Energy Efficiency Design Index (EEDI), which is widely analyzed, should also be mentioned with respect to ships. EEDI has been described in detail in Annex 8 to MEPEC 212(63). The index refers to new ships and constitutes a measure for ship energy efficiency. EEDI is the most significant technical index for new ships and its goal is to promote the use of more efficient (less polluting) devices and motors.

Another index developed by IMO is Ship Energy Efficiency Operational Indicator (EEOI). It is a voluntary measure for energy efficiency assessment for ship in operation.

INTERNATIONAL ENERGY AGENCY RECOMMENDATIONS, 25 Energy Efficiency Policy Recommendations – 2011 Update

The above mentioned publication includes 25 recommendations regarding the energy efficiency policy. There is no direct reference to ships, however, certain recommendations concerning the transport sector, as well as industrial sector may be applicable for vessels.

Taking into consideration that the transport sector is the most demanding area for improving energy efficiency, governments should in particular put in place policies the aim of which would be to improve efficiency e.g. of air conditioning, lighting and other non-engine elements affecting fuel consumption. Additionally, they should implement solutions due to which energy efficiency improvement occurs for the transport system at national, regional and local level [12].

Within the industrial sector, the recommendations apply to the implementation of optimization

policy for energy effective devices and industrial systems and efficiency improvement through energy management [12].

In order to achieve the goals related with energy savings, governments should adopt the IEA recommendations which concern, among the others, the implementation of a package of measures to promote energy efficiency in small and medium-sized enterprises [12].

Conclusions

It shall be highlighted that energy efficiency improvement is a very significant issue. The issued legal acts, in their main content, are based on norms, although they do not refer thereto and they constitute separate documents. The legal provisions form recommendations and impose an obligation to apply [6]. However, the current legislation in Poland is focused mainly on adopting legal acts related in particular with energy efficiency and its assessment for the residential sector. Therefore, in order to perform accurate energy efficiency assessment for fishing vessels, the provisions of the European Union and the recommendations of IMO should be particularly taken into consideration. It is also important to consider the environmental aspect of the entire project during the assessment of energy efficiency.

References

1. Act of 15 April 2011 on energy efficiency. Journal of Laws 94, item. 551 as amended.
2. Council Regulation (EC) No. 744/2008 of 24 July 2008 instituting a temporary specific action aiming to promote the restructuring of the European Community fishing fleets affected by the economic crisis.
3. Reply of the Undersecretary of State in the Ministry of Transport, Construction and Maritime Economy Anna Wypych-Namiotko, dated 15th November 2012 to an Interpellation No. 10342 on the new European Directive limiting sulphur content of marine fuels submitted by the Deputy, Mr. Jan Warzecha, on 11th October 2012.
4. Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels.
5. Act of 30th August 2012 on the conformity assessment system and the Act of 20th April 2004 on marine equipment.
6. BŁAJSZCZAK G.: Efektywność energetyczna, www.energetyka.eu, September 2011
7. Act of 16th March 1995 on prevention of marine pollution by vessels. Journal of Laws 47, 1995, item 243.
8. <http://sejmometr.pl/prawo/127250>, access on 23 June 2013.
9. Managing Risk, Ship Energy Efficiency Management Plan – SEEMP, DNV (Det Norske Veritas), <http://www.dnv.com/industry/maritime/servicessolutions/consulting/environment/seemp.asp> access on 23 June 2013
10. <http://www.shippingandco2.org/SEEMP.htm>, access on 23 June 2013.
11. http://www.prs.pl/_files/parent148/kon_c9_2011_zm2_2012.pdf, access on 23 June 2013.
12. 25 Energy Efficiency Policy Recommendations – 2011 Update.

Unia Europejska
Europejski
Fundusz
Rybacki



Operacja współfinansowana przez Unię Europejską ze środków finansowych Europejskiego Funduszu Rybackiego zapewniającą inwestycje w zrównoważone rybolówstwo

The papers are financed by the Project namely “Energy audit performance for fishing vessels’ groups in order to prepare operation management system in an environmental friendly manner” under Operational Programme “Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007–2013”, financed by the European Fisheries Fund.