

# ECOSTEP - SAVING ENERGY WITH AC DRIVE OF TOWING PUMPS



KONGSBERG

## DECK MACHINERY

### Fish and special purpose vessels. EcoStep - saving energy with AC drive of towing pumps

#### Introducing AC variable speed drive of towing pumps

The maritime industry is challenged by increasing focus on energy saving, fuel costs and tougher emission regulations. As a result of this Kongsberg Maritime deck machinery has come up with a solution called EcoStep, a system where the main feature are AC drive of towing pumps utilizing the low pressure dynamic capabilities.

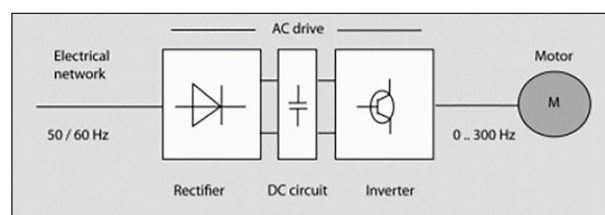
In order to control oil flow from the pumps to winches according to needed performance, accurate speed control of the electric motor for screw spindle pumps is the key parameter. By doing so we are able to reduce the energy consumption significantly during the trawling operation.

It is a known fact that AC drives uses less energy than an alternative fixed speed mode of operation. Energy savings for AC drives are generally in the range of 20 to 50%.

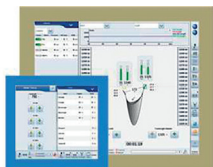
## THE TECHNOLOGY

The speed of towing pumps are controlled by changing the frequency of the electric supply to the motor. An AC drive converts the frequency of the network to anything between 0 to 300 Hz and thus control speed of motor proportionally to the frequency.

It is like reducing speed of a car by pressing the brakes to slow down the speed.



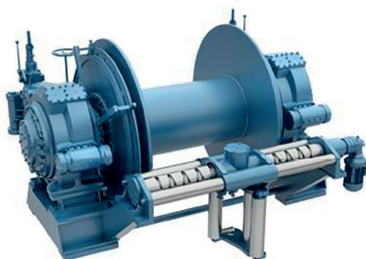
## The system



Synchro RTX - control and monitoring system



AC drive



LP trawl winch with electric spooling gear



Pump units with AC electric motor



## The saving

A significant reduction in power requirement, fuel consumption and emission

AC drive of towing pumps optimizes the needed speed for different operational modes. The result will be an average reduction in power consumption of over 40% compared to existing solution. By reducing power consumption we reduce fuel consumption and likewise emission of NOx, CO2 and SOx.

This fact can be theoretically documented by a calculation model which we have developed. Backing our theoretical calculation model are the encouraging results onboard vessels in operation where the first generation of the system is installed.

The energy saving calculation model takes into account winch operational data, vessel operating conditions during fishing, sea state conditions and days at sea for a year.

From output data of calculation model we are able to compare power consumption between existing system and EcoStep with respect to operational modes as 'shooting', 'towing' and 'haul in' during the trawling process. This data will certainly be a good basis for investment considerations.

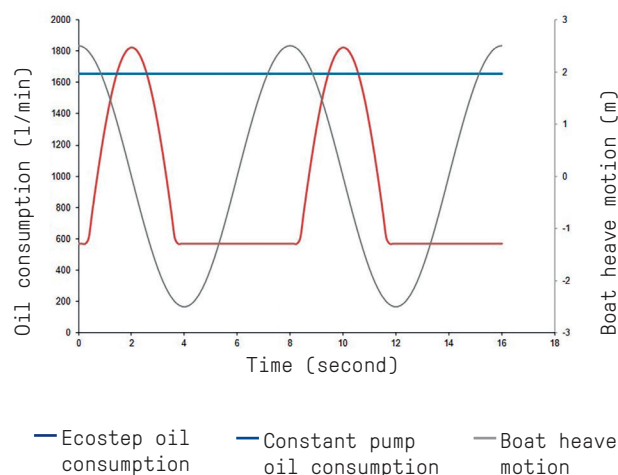
## Customer benefits

Following benefits can be achieved compared to fixed speed mode operation

Economical:

- Reduced power consumption in excess of 40% in average.
- Reduced fuel consumption and consequently reduced fuel cost
- Less emission and likewise less emission tax
- Investment is eligible for the Norwegian NOx refund scheme
- Very favorable pay back time for investment
- In house supplier of AC drives for dedicated support
- Low start up current allow use of smaller fuses and supply connections
- Smooth start and stop of pumps - less mechanical wear
- Lower noise level - improved working environment for crew
- Retaining all dynamical features and operational capabilities of BRH64

## Oil consumption during two 8 second wave cycles



— EcoStep oil consumption

— Constant pump oil consumption

— Boat heave motion

